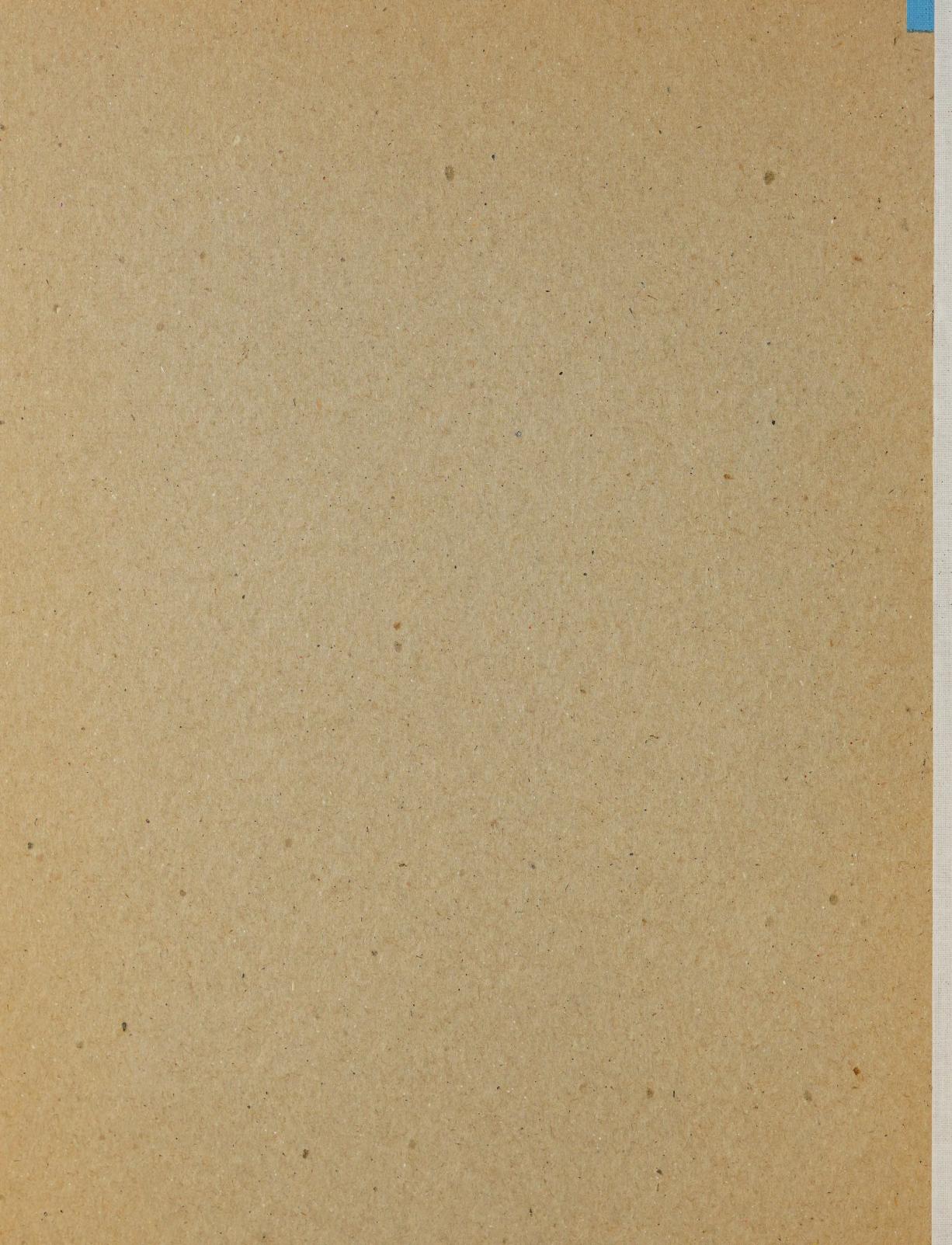


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Advisory Committee
Northern Development
North of 60°

Comité consultatif
mise en valeur du Nord
Au nord du 60°



1976 - 1977
Government
Activities
in the North

1976-1977 Government Activities in the North

1976-77 Report and 1977-78 Plans

Advisory Committee
on Northern Development

Cette publication existe aussi
en version française

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Introduction

I am pleased to introduce the 1976-77 edition of *Government Activities in the North*, published in both official languages by the Advisory Committee on Northern Development.

Authorized by Cabinet, this publication reports annually on government activities in the Yukon and Northwest Territories and is useful as a reference source for those with an interest in developments in the Canadian North.

The report reviews the activities of the Territorial governments and each Federal department, agency and crown corporation, together with their responsibilities and plans for future development in the territories. Your attention is drawn to a companion publication entitled *Annual Northern Expenditure Plan, 1977-78* which refers specifically to government expenditures in the North and is available from the Department of Indian Affairs and Northern Development.

On behalf of the Minister, I wish to thank all contributors to this report.

A. Kroeger
Chairman,
Advisory Committee on Northern Development

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Federal
Departments,
and Agencies

Advisory Committee on Northern Development (ACND)

Responsibilities

The ACND provides, through a committee structure, the mechanism for interdepartmental planning and co-ordination of federal policies and programs pertaining to the Canadian North.

Through a number of specialized committees and working groups, the ACND reports to the Minister of Indian Affairs and Northern Development through its chairman, deputy minister of the department.

The following is a list of the principal ACND committees and their chairmen. Information on the terms of reference for each committee is available through the ACND Secretariat.

Policy Committee

Chairman: Mr. A. Kroeger

Department of Indian Affairs and Northern Development

General Committee

Chairman: Mr. G.S. Murray

Department of Indian Affairs and Northern Development

Transportation Committee

Chairman: Mr. M. Hagglund

Transport Canada

Committee on Science and Technology

Chairman: Dr. J.D. Keys

Department of Energy, Mines and Resources

Committee on Northern Communications

Chairman: Mr. A. Lapointe

Department of Communications

Committee on the Employment of Native Northerners

Chairman: Mr. A. McCallum

Government of the Northwest Territories

Federal-Territorial Economic Planning Committee

Chairman: Mr. E.M.R. Cotterill

Department of Indian Affairs and Northern Development

Advisory Committee on Industrial Benefits from Natural Resource Development

Chairman: Mr. G.E. Hughes-Adams

Department of Industry, Trade and Commerce

Federal Interdepartmental Co-ordinating Committee – Yukon

Chairman: Mr. A. Pearson

Commissioner of the Yukon Territory

Northwest Territories Co-ordinating Committee

Chairman: Mr. S.M. Hodgson
Commissioner of the NWT

Interdepartmental Advisory Committee on Northern Roads

Chairman: Mr. D. MacKinnon
Department of Indian Affairs and Northern Development

Federal-Territorial Regional Planning Committee

Co-Chairmen:
Mr. D. MacKinnon
Department of Indian Affairs and Northern Development
Mr. A. Gordon
Government of the NWT

In addition, working groups, which report to the principal committees, are formed as required to deal with specific tasks or projects.

Agriculture Canada (AGR)

Responsibilities

To provide technical assistance through consultation and research to those in the North requiring information on matters dealing with food production; to provide an identification and consultative service for insects, arachnids, nematodes and plants in the North; and to provide technical expertise on soil and vegetation surveys in the North.

Review of 1976-77

The activities of Agriculture Canada in the North were reduced in 1976 compared with the immediately preceding years. The study of the carrying capacity of the Slave River Lowlands is complete, the equipment removed from the Grand Detour, and the major portion of the report written and in the hands of the Land Management Division, Department of Indian Affairs and Northern Development.

Most of the soil survey and land use studies of the MacKenzie River Valley have been completed. Some supplementary work was done in connection with a pipeline corridor.

The Northern Research Group, Beaverlodge, is presently reviewing their objectives for future research. It is anticipated — but not yet decided — that much of their research will continue to focus on agricultural production between the 55th and 60th parallels. When complete a copy of these plans will be made available as general information.

Northern Research Group, Beaverlodge, Alberta

Review of 1976-77

Assistance and advice was provided the Saskatchewan Institute of Pedology in determining grazing values of certain areas in the Yukon for domestic livestock. The survey was undertaken mainly in the settled areas along the major river valleys and highways. In 1976, the production of native grazing species was exceptional, because of the better than normal rainfall. For the most part, ranges in the Yukon are forested with aspen, spruce and larch. There are, however, some open areas on south-facing slopes and thin soils where grassland species predominate. There are also extensive burned areas where grasses and palatable forbs make up a large percentage of the above ground biomass. These ranges produce from 100 to 400 kg/ha oven dry matter (ODM) of forage. They represent a significant grazing resource in the

Yukon. At the present time, range in the Yukon is not limited. However, in some areas it is abused through yearlong grazing by horses. The use of Yukon ranges by domestic livestock will be completely dependent upon development of land for forage production to be used as winter feed. Problems that

will be encountered include: poisonous weeds (Larkspur, Monkshood, Camas); biting and sucking insects (mosquitoes, black flies, no-see-ums); predation of animals on rangeland, and marketing. During the survey extensive areas of subalpine ranges growing rough fescue were noted as having a potential for beef production.



Results of a summer burn on one of the large sedge grass meadows on the Slave River Lowlands, NWT

Biosystematics Research Institute, Ottawa, Ontario

Review of 1976-77

The Institute continued to provide an identification service on insects, arachnids, nematodes, vascular plants and fungi for various government agencies and universities operating in the North.

A manuscript on the key to chironomid larvae (some 200 species), developed for use by the Freshwater Institute in Winnipeg, Manitoba, has been completed and was submitted to the Institute for publication. Research continued on the description of about 20 species of nematode parasites of insects from the MacKenzie and Porcupine River Systems. A draft of the paper (approximately 30 pages with 20 plates) was completed and will be submitted for publication in the Canadian Journal of Zoology. This paper will provide a new method of mermithid identification in Canada.

A collecting trip to obtain beetles in the

Yukon in 1976-77 was not undertaken because of lack of funds.

Soil Research Institute, Ottawa

Review of 1976-77

The Institute continued its contribution of technical information and expertise to northern projects. In an effort to formulate an agricultural policy for the Yukon and Northwest Territories, a party of soil surveyors spent the summer months in selected valleys of the Yukon Territory and in the Hay River Valley, NWT. (See also the preceding report on the grazing potentials of these areas).

At the request of the Geological Survey of Canada one soil surveyor conducted an exploratory biophysical survey in the Central Keewatin District to assist in delineating a pipeline corridor.

Canadian Broadcasting Corporation (CBC)

Northern Service

Responsibilities

To provide a broadcasting service which will meet the special needs of the people living in the North — native and non-native.

To give northerners a sense of identity with the rest of Canada and an awareness of the needs they share with Canadians across the country; and to inform Canadians about the people of the North and developments there. Since establishment of the CBC Northern Service in 1958, public awareness of the North has vastly increased; prompted by interest in the settlement of native land claims and in the controversy about development of the North's non-renewable resources.

One of the major responsibilities of the CBC Northern Service is to keep in touch with and illustrate changing opinions, attitudes, plans and activities concerning the North. The CBC also plays a role in preserving the cultural identity of the Inuit and Indian peoples by providing communication in local languages and dialects, and by reflecting in its programs, their values and traditions.

Review of 1976-77

Note: Program titles appearing in italics are Northern Service radio or TV programs — Nallachine. Program titles appearing in quotations are CBC National Network Programs — "The National".

During the year, Director Andrew Cowan and Engineering Manager Lloyd Moore, both among the founders of the Northern Service, retired from the CBC. Douglas Ward was appointed director and initiated studies concerning Northern Service radio programs produced in the south for broadcast in the North; the northern shortwave service; and the northern service headquarters organization and how it can best serve the production centres.

Phases of the latter study were carried over into 1977-78. Later in 1977, decisions will be made about implementing the recommendations of these studies.

The Armed Forces service liaison work of the Northern & Armed Forces services was transferred back to Radio Canada International during the early part of 1976.

In December, 1976, the Ottawa headquarters of the Northern Service was moved from near Confederation Heights to the new office tower building at Lanark Avenue, above the CBC Ottawa Area television studios.

Among the quarterly managers' meetings

held throughout the year, one was combined with a training course in management by objectives, in September at Inuvik.

The specially selected coverage team continued to follow the Mackenzie Valley Pipeline through its final months. News reports were provided in English, eastern and western Inuktitut, Chipewyan, Dogrib, Slavey, Hareskin, and Loucheux. At the end of the Inquiry, the Northern Service retained the services of all native-language reporters recruited during the preceding 20 months, with the exception of Jim Sittichini, who retired.

Judge Thomas Berger, when speaking about the importance of the CBC Northern Service coverage to the comprehensiveness of his Inquiry said:

"I should mention the vital role of the CBC's Northern Service. The Northern Service has provided a crew of broadcasters who broadcast to the North each evening highlights of the day's testimony at the Inquiry. They are of course entirely independent of the Inquiry. They broadcast from the Inquiry, when it is sitting in Yellowknife or in the communities, each day, in English and the native languages. In this way the people in communities throughout the North are given a report in their own languages regarding the evidence that has been given each day at the formal hearings in Yellowknife. The broadcasts mean that when we go into the communities the people who live there understand something of what has been said by the experts at the formal hearings, and by people in the communities we have already visited."

(Extract from Queen's Quarterly, volume 83, number 1, Spring 1976)

An objective for the year was achieved in the establishment of a newsroom in Frobisher with the recruitment of two editors. Training in news reporting and editing was provided, through the CBC National Radio operation in Toronto, to participants from some of the five production centres in the North.

Month-long exchanges of announcer/operators between northern locations began this year for the first time. An assessment will be made after a number of these "working visits" have taken place.

Formalized training sessions for both English and native-language announcer/operators, and for a number of technicians from most locations were provided throughout the year.

Both individual and general training seminars took place at the Ottawa headquarters, for clerical staff from the production centres.

Coverage of territorial council meetings in the Yukon and Northwest Territories has not been as complete as the Northern Service has wanted. In the Northwest Territories this kind of coverage has been particularly difficult when meetings have been held outside Yellowknife, and accommodation has not been available for the number of CBC staff needed to report through broadcast in all the required languages and dialects. Also, upon occasion, because of commitment to other program responsibilities, and staff shortage, total coverage of all the council meetings has not been achieved.

In October, 1976 the Director of the Northern Service spoke to the NWT Council at the meetings in Rankin Inlet, NWT. Some members of the CBC Berger team were between hearings and an attempt was made to report the entire session for radio and television.

1976-77 was the first year that Northern Service production centres and headquarters used a computerized accounting system, which made monthly detailed "by program" financial reports possible.

In support of one of the recommendations of the Inuit language commission to use a new orthography in syllabics and roman print, the Northern Service printed 31 000 copies in the latest of its series of Inuktitut orthography and calendar cards. When printed in January, wide distribution was made across Canada, but mainly to individuals in the North, and to educational authorities.

Native organizations were encouraged and assisted in the production of radio and television programs. Those assisted included the Northwest Territories Native Communications Society, Yellowknife; the Whitehorse Native Communications Society, Ye-Sa-To; the Council of Yukon Indians; the Pond Inlet community; Nunatsiavut (the Frobisher television production unit); and the community television operation in La Ronge, Saskatchewan. Community radio assistance by CBC staff is given from almost all the program centres in the North.

The Northern Service made contributions of syndicated programs to other CBC areas. Some of these items were carried by Radio Canada International; others, such as "Between Ourselves", and "The National News"; are regular programs of the English National Radio and Television Networks.

The inaugural meeting of the CBC Mid-Canada Planning Group was held in early March, with members drawn from across the English Services Division and observers participating from the French Services Division.

The aim of the group, whose chairman is the Director of the Northern Service, is to join stronger forces with those CBC stations already established, and to be established in the mid-Canada region, in order to exchange ideas, programs, and discuss plans and policies.

The CRTC hearing held in May at Winnipeg concerning the renewal of some CBC radio and television licences in the North, provided the first opportunity since February 1974, for northerners and members of the Northern Service to appear before the commission to state their views about broadcasting in and to the North. On behalf of the Northern Service, the director expressed his concerns and made constructive suggestions, while at the same time emphasizing the financial constraints imposed upon operations.

Plans for 1977-78

Coverage of territorial council meetings will be increased. Extensive radio audience surveys will be carried out in the Yukon and the Mackenzie District of the Northwest Territories. Also, at the request of the Yukon Territorial Government, the CBC has agreed to study radio reception in the Tintina Valley, the Stewart River Valley and along the Yukon and Pelly rivers, to find out whether coverage can be improved within present CBC policy and criteria for extension to existing coverage. Similar studies may also be carried out along the Alaska Highway in the Kluane area.

CBC is bound by the regulations of the Accelerated Coverage Plan in that radio and television services are, for the moment, being installed in only those communities with a population of about 500. There are many communities in the North whose population is less than 500. There are no approved and funded CBC plans to bring radio or television services to these communities in 1977-78.

Some program evaluation will be initiated through public meetings and by other members of the CBC. There have been, over the past few years, many requests from northern government and organizations, to provide some kind of feedback, establish advisory groups, and encourage regular program consultation. The director intends to set up, through each production centre, a series of meetings which will take place on an on-going basis to represent all points of view in a community. "...people getting together and critically looking at both radio and television programming, and CBC staff asking "Look, does this work, how does it sound, are you getting the information you need, let us have

your evaluation, your appreciation, should it be longer or shorter?" That information will be documented and will be used both in our program evaluation and in the development of new schedules. (Extract from presentation by the Director of the Northern Service to members of the N.W.T. Council, Rankin Inlet, October, 1976).

Whether to establish special subject advisory councils and hold public forums is being considered by the President of the CBC, and if approved by the Board of Directors of the corporation, would be developed within both the French and English service divisions. The Northern Service is a part of the latter division.

A number of studies are planned by the Northern Service:

Where do we go in northern television production?

Continued support and development of Native-language programming.

Community development, adult education and curricular work.

July 1st, 1977, Canada Day celebrations on CBC National Network Television, will have a 10-minute segment from the North (among other segments from across Canada during the three-hour show). About 14 northern artists will take part in a concert on a stage above McNiven Beach at Yellowknife, NWT.

Engineering – Highlights of radio and television technical operations

Review of 1976-77

The integration of existing and new technology to satisfy the special needs and problems facing CBC in the North involved a design which, when implemented by Alan Martin, assistant engineering manager for the Northern Service, led to a significant increase in time for creative work in programming by simplifying the more technical aspects of program production. An example of this design was the 'humanization' in 1976, of a CBC Frobisher production desk for radio news, providing telephone recording, sending, cassette dubbing, editing, and tape packaging, all within arm's reach of the operator.

Another application of this simplification philosophy to design followed the time-and-motion study of northern service announcer/operators which showed a considerable duplication of effort involved while operating the production console in radio station operations. Specifications and functional drawings were made, then discussed with the staff at

the production centres before the new console was built and installed. It emphasizes the announce aspect, removes the concern of operating, and reduces the training period for announcer/operators to a minimum. As modified, the console design is also meant to provide facilities for local input to the normally network-fed LPRTs. CBC Whitehorse in the Yukon received such a console in February, 1977.

Additional equipment has been purchased for Whitehorse which will eventually provide that radio production centre with the facilities to monitor and program a remote low power relay transmitter via normal telephone circuits. This operation is referred to as MAR-CAP – Monitoring and Remote Control and Programming.

Northern Service Engineering, in an effort to respond to the needs of northern communities interested in community radio, put together a package of equipment known as FLIP – Facility for Local Input Package. These packages are now being installed in some small communities both in the North and in the mid-Canada area, and will facilitate the broadcasting of community radio program on the local CBC transmitter. This is an ongoing project.

Since February, 1976, viewers in Churchill, have been receiving their regional and national network television programs via microwave from Winnipeg. During the summer, the satellite earth station at Churchill was transported to Tuktoyaktuk, and on November 23rd, Tuk viewers began receiving their television programs via satellite instead of off-air pick-up from CBC Inuvik, as they had been for the past few years. However, due to the television signal interfering with local communications, a change had to be made from channel number 13 to 8. The changeover was completed by March 8th, 1977, following CRTC application and approval.

Accelerated coverage plan television installation completed in 1976 were:

the rebroadcast transmitter at Lake Demerais (September 9th); the feed to Fort Providence, from Pine Point, via Hay River, and Lake Demerais (September 9th); and the microwave feed to Rae/Edzo, from Yellowknife, via Trout Lake (December 20th). Under normal coverage, installations and developments were:

the radio feed to Coppermine, changed on October 1st from satellite to microwave from Inuvik; and establishment of an LPRT-FM at Port Radium/Echo Bay, which went on-air January

15th, 1977. The radio program feed is also via microwave, from Inuvik.

Channel A Audit Four (AA4) is a satellite, radio program distribution channel used by the Northern Service to transmit programs from its production centres at Inuvik, Yellowknife, Frobisher and Montreal, to some of the transmitters installed in remote communities under the accelerated coverage plan. Program distribution by satellite first began on the Northern Radio Network in December, 1975. Since February, 1977, CBC Whitehorse can access AA4, and can provide programming which could extend the broadcast day on that network to 24 hours.

CBC Frobisher was involved in a communications technology satellite experimental demonstration from the Ottawa Conference Centre for the 'Radio in the 80's' Conference in the early summer of 1976. Announcer/operator Ilisapi Davidi travelled down to Ottawa and produced programs which were sent to the Frobisher Production Centre during most of the week of the conference to be broadcast on the Northern Radio Network (AA4).

Another highlight which involved CBC Frobisher, was the Community Radio Workshop sponsored by Inuit Tapirat of Canada, and held locally in November, at which community delegates said they wanted to set up a system for exchanging tapes, and asked CBC to help out. Peter Baril, the CBC's Location Manager, agreed that he would have the tape cassettes reproduced as they came in from the community stations, and would organize their distribution to other communities. By February, 1977, the production centre received, and engineering installed the entire cassette duplicating equipment. Copying programs and distribution among community-operated stations began. Subsequently some of the programs were also aired on the Northern Radio Network.

Through an Order in Council of January, 1977, the CBC Northern Service was granted authority to purchase the Casca Building, which was leased to house the Whitehorse radio production facilities. Acquisition of the building allowed Northern Service to complete essential expansion and consolidation; i.e. the newsroom moved to the main plant from their temporary accommodation across the street.

By the end of 1976-77 a new CBC building housing studios, technical workshops, and offices, neared completion in Yellowknife. The up-to-date facilities in this plant will mean significant changes and improvements can be made to broadcast services to the audience, both in the city itself and in the communities

on the Mackenzie Radio Network. English-language listeners will soon be able to hear more English-language broadcasts and listeners in native-language-speaking communities will hear more local programming in Slavey, Dogrib and Chipewyan.

In the design of the new building, some consideration (space) was made for possible future television production.

Among other features, the new premises has the latest in sophisticated equipment for improved studio quality in voice and music recording, and machinery that is easier to work with; increased working and creative production space; and public 'bleachers' overlooking the master control room and main studio to allow for direct community involvement in the program production.

Plans for 1977-78

A further utilization in satellite technology will allow the CBC, in the spring of 1977, to telex messages to the northern production centres on a special feed. This new, one-way system will be in addition to the regular, existing telex service, and will require a receive-only machine at each location. There will be an overall saving in telecommunications costs through the use of one of the satellite channels already rented by CBC from Telesat Canada. However, this advantage will have to be assessed against the disadvantages, e.g. a message sent to one location automatically goes to all locations connected to the new satellite telex system. A resulting impact will be the large quantity of paper constantly pouring from the machine. An evaluation of the system will be made after some months usage.

Spence Bay, NWT, is on the Accelerated Coverage Plan schedule for installation of radio and television services by early 1978.

Northern Service is planning to establish a manned radio production unit in the Keewatin Region with the resources of its present Churchill operations. (See CBC Churchill section of this report for more information). The unit will provide both a program source and a gathering point for programs, news and information from a hitherto, relatively untapped area of contributors and listeners. (Shortwave does not reach the Keewatin on regular reception due to atmospheric disturbances). Direct access to the Northern Radio Network (AA4) will also be provided so that programs can be transmitted to other northern communities. A study will first be carried out by the CBC to find out the best way to serve the

Keewatin communities, and to decide the location of the production unit.

Northern Television Service

Northern television began with taped programs in 1967 and moved to live satellite transmission in 1973. The transmitters of the Northern Television Service (NTS) are supplied mainly from the National Network, and a major objective is to make the regional part of the service more relevant to the special needs and interests of the North. Although NTS has no production staff or equipment of its own, it has made progress toward better regional service by means of special productions in co-operation with other CBC services, the increased use of station-break periods for public service announcements, preparations for northern production, and assistance to native production groups.

Review of 1976-77

The medium of Super-8 filming is being considered by CBC as an alternate production method to videotape and 16mm film, for special uses. A half-hour experimental program, was made during the summer about the Native Peoples' Science and Technology Exhibition at the Ontario Science Centre, Toronto. The program was made in Inuktitut, hosted by broadcaster/producer Elijah Menarik, and produced through co-operation with the CBC English Divisional Training, and the CBC Super-8 Film Committee. It was primarily meant to illustrate the ability of the medium in production of full-length productions for television.

The Northern Television Service is playing a considerable role in evaluating Super-8 for application in the Arctic through: *Native Heritage*, which NTS initiated;

involvement with National Film Board and Nunatsiarmiut (the Inuit production unit in Frobisher);

and by discussion of its use when NTS participates in an advisory capacity at the community television workshop, planned for April, 1977, at Pond Inlet.

A key figure in the evaluating process of Super-8 with its application in the North, has been Tom Egan, Film Quality Control Officer for CBC Ottawa Area. Mr. Egan, through his many years of experience in film, combined with his constant awareness of new methods, has been a great asset in providing his services as a member of the Corporate Super-8 Film committee.

By the end of 1976, there were at least 53

communities in the territories and northern parts of the provinces which receive the programs of the Northern Television Service. Some of the stations are owned and operated by CBC, others receive programs by off-air pick-up or are non-CBC community licensed stations.

The service telecasts approximately 16 hours a day, of which 12 hours are programs from the (southern) National Network. The remaining four-hour period, usually assigned each region for local and regional programs, is filled by the Northern Television Service with programs especially selected from sources as follows:

CBC Regional Exchange

Alberta Native Communications Society

National Film Board

Overseas agencies

U.S. syndicated programs

Nunatsiarmiut production unit, Frobisher (Inuktitut series)

Ontario Educational Communications

Authority

Also included in those four hours a day during the past year, and though still possessing no production staff or equipment of its own, NTS has nevertheless been able to provide northern-related programs through special arrangements with and the co-operation of other CBC areas

Tarogavut — 44 x 15-minute topical programs in Inuktitut a weekly program produced in Montreal using FSD facilities, CBMT producer, Marie Tessier-Lavigne, and Northern Service radio staff as hosts.

Mackenzie Valley Pipeline Hearings reports During the final six months of one and one-half years continuous coverage, a seven minute report was telecast nightly, Monday to Friday, in seven native languages, dialects, and in English. Shot in Yellowknife and northern communities, the reports were edited and transmitted via satellite from Vancouver and Toronto.

Northern Notes a five to nine minute weekly program of community announcements. Compiled and written by Ellen Chassé, On-Air Promotion Assistant, NTS Ottawa.

NTS Fall Program Preview one half hour program launching fall schedule showing segments of NTS and network programs. Produced by Alwyn Horscroft, NTS presentation co-ordinator, Toronto.

Nunavut one half-hour program on presentation of Inuit land claims brief to Prime Minister and Cabinet, produced by Montreal producer, Marie Tessier-Lavigne, and an Ottawa area film crew.

The Native Heritage a one-half hour program on the Native Exhibition at Ontario Science Centre last summer. An experimental program to test our Super-8 systems in mounting a full-length program. Produced through co-operation with ESD Divisional Training and Super-8 Film Committee. Since its initial telecast to the North, the program has been shown by CBC in Italy and telecast in Moscow, USSR.

Other aspects of the service are:

a weather forecast synopsis for various northern areas consisting of a two minute, on-screen rolling print-out, transmitted approximately six times daily;

30 special programs were procured for telecast in 1976-77, in addition to the numerous regular programs procured for daily telecast;

262 Anikinfo (public service) announcements (in English and Native languages and dialects);

acquisition of some Super-8 production equipment. Yellowknife and Whitehorse will be locations where limited production capabilities are expected to be established; special feeds of: audio reports (3) from Rankin, NWT territorial council meetings to the rest of the Northwest Territories, western CFL Finals (arranged with CTV), World Cup Hockey series (arranged with CTV). An experimental simulcast in Inuktitut of an English-language program was arranged in October by the Northern Television Service with the co-operation of the National Network. First of all "Images of Canada-Spirits in a Landscape" was dubbed into Inuktitut and this version was telecast early one evening to the North only. Then about two hours later, the English version came on and the Inuit were able to keep the picture on their sets, turn down the volume, and turn on and tune to their local CBC radio station for a repeat of the Inuktitut-language audio track;

encouragement of and technical assistance to native organizations in developing their own productions.

visual presentations of northern artwork, slides and photographs for television identification.

Items of continuing contention for some members of the viewing public have been:

"Movies. Why are there so many bad ones?"

Late movies for television are mainly purchased in packages. Every package contains good and bad films. CBC's policy is first to spend its program money in Canada on original productions of its own making. As well,

because of escalating costs, the corporation is now out of the market for first run late movie packages. Movies for the North originate with CBC Vancouver. Fare ranges from "Boston Blackie" to the more up-to-date product, but the majority of features are old timers.

Northern Television Service could acquire its own features. However, should it do so, they would still be non-current. NTS does not purchase its own movies because at present the facilities available do not permit separate transmission of them to the North. Also, NTS would need additional money to pay for the manpower and overtime required to feed its own movies out of Toronto instead of Vancouver.

"French-language programs. Why are they telecast?"

Five per cent of the population in the eastern Arctic are of French origin, and three per cent in the western Arctic. NTS tries to telecast French-language programs on the two satellite channels in the same proportion. The fact that NTS does not telecast native-language programs in proportion to the native population of the North is because there are few native-language programs available either through its own limited facilities or by purchase from non-CBC agencies. NTS can draw upon French-language programs from within the corporation as well as from the francophone countries around the world.

"The amount of sports on television is far too much."

At certain times of the year, criticism of overwhelming sports programming is valid, especially around the end of winter and beginning of the fall when coverage of all the hockey, baseball and football series begins to overlap, and there are playoffs, too. There is little NTS can do to improve this recurring situation; sports programming is part of the National Network service.

"The programs all over the North are not shown at their proper time. Why do some programs have to be run so late?"

There are six time zones to contend with in the North. Normally NTS can distribute programs on only two channels on the satellite. To improve the distribution, CBC would need more money to rent other channels and construct a delay centre. However, the highest priority is to get the resources to begin producing television programs in the North. Additional satellite channels and delay centres are not a high priority.

"Some programs are obviously coming from CBC Vancouver. Viewers in the Mackenzie

Delta and District say they are more commercially and socially linked to Edmonton and want their programs from there."

NTS has the use of two channels on the satellite to distribute television to the entire North. If the CBC Edmonton-produced evening and late night news and sports are sent to the Mackenzie Delta and District on the western channel, then all the viewers in the Yukon, whose links are more towards British Columbia, would probably complain as they are also on the same channel. NTS began the satellite service in 1973, sending the western Arctic very few programs each week from CBC Vancouver. To change over now would not solve the problems.

Plans for 1977-78

Production

Annivimmitu a half-hour following an Inuk as he leaves home to be treated in a Montreal hospital. An effort to allay some existing fears of southern hospitals. To be produced by Marie Tessier-Lavigne, Montreal.

Yukon Land Claims Report a 15 minute experimental program to test the Paul Griffin/Ted Yardley team capabilities in putting together a program. They are suggested candidates for coverage of upcoming hearings into a pipeline down the Alaska Highway. NTS plans to report in summary once a week. Arrange with the National Network production staff of the children's program "Mr. Dressup" to produce some programs in the series in Frobisher.

A study will be initiated to determine what in northern programming is relevant to the needs of the native and non-native population.

Institute, throughout the Northwest Territories and the Yukon, the production of relevant, regional television programs;

The Northwest and Yukon Territories are the only regions within CBC that have no CBC television production facilities of their own yet. These are areas with proven and dramatic communications' needs that the CBC, with the assistance of independent northern groups, can fill.

A daily family-directed magazine and entertainment program, and a daily children's program should be among the first northern produced programs. The programs must be visually rich and interesting, exposing northerners to the variety of the North, and would have the crucial task of helping to affirm the process of growing up in the North in a time of current, rapid, social change. Much use could be made of hand puppets, animation

and other forms of characterization developed with and by northern people. Lengths of the programs would be contingent upon facilities, finances and the development of talent.

Detailed program planning would only be possible after consultation with northern groups. After this territorial need has been met, it will be important to develop TV production capabilities in mid-Canada; and to organize substantial program exchange among all mid-Canada and far northern television production centres.

A strong training component will be established to ensure that northerners become part of the permanent operation on a professional basis.

Efforts will be made to ensure that northern native languages and dialects will be highlighted in northern television productions. Production in the North by northerners will be encouraged with, as much as is possible, whatever training facilities may be required.

New Program Sources

The service will assist in development of programs by independent northern producers through purchase of programs at realistic prices.

NTS will need substantial quantities of procured programs, indefinitely, and a liberally funded, northern programming procurement group will be established which will use international sources to secure material relevant to the North.

With adequate funding and research, a program schedule will be devised to make use of all program resources, National Network and Northern Regional, to schedule shows at appropriate northern times.

A monitoring capability will be installed at Ottawa headquarters to view the program service provided to the North.

The Northern Television Service is well aware of the impact the medium has on the viewing public, particularly on children. As soon as more financial resources are made available, NTS intends to improve programs by every means possible.

To minimize some of the negative aspects of television on northern viewers, NTS is prepared to negotiate and will consider a community's wish to "black out" certain program periods in individual communities, and replace them with community-produced, native language programs in the regional schedule. It would then be possible for a community with its own television operation to insert a local Native-language program. An experiment in community at Pond Inlet will be supported by NTS.

Radio

The CBC Northern Service was conceived as a radio service when set up in 1958 by Order in Council. In 1965, recommendations of the Fowler Commission assured CBC of its plan to continue and expand radio broadcasting to the North. The North is now provided with both radio and television programming.

Over 19 years, CBC has established six manned radio production centres in the North, one of which, at Goose Bay, Labrador, was turned over to the Newfoundland Region in 1970. Some of these centres began as community and/or Armed Forces radio stations, as did a number of the 38 low power relay transmitters (LPRTs) now receiving programs of the service, in the Yukon, Northwest Territories, and northern parts of Manitoba, British Columbia, and Alberta.

CBC radio in the North combines national programming with specialized material for northern listeners, much of it in the native languages and dialects. Production centres at Inuvik, Yellowknife, Whitehorse and Frobisher feed networks of small transmitters across the vast areas of the North. A station at Churchill provides local service and can also be heard with irregular reception at Indian communities miles away.

The northern stations' programs cover a wide variety of subjects: native affairs, sports, consumer interests, interviews with public figures and politicians, music, education, religion, drama, northern festivals and history, phone-in programs on local and regional issues, personal messages, and important public meetings. There is a continuing effort to improve and expand the presentation of news and current affairs programs in the native languages and dialects.

Another vital part of the service's ability to reach its audience has been Shortwave. Northern Shortwave is now under study as its terrain is gradually being covered by isolated LPRTs installed under the Accelerated Coverage Plan, and which LPRTs are receiving radio programs delivered by the satellite on a special network, or by microwave from one of the production centres. An essential difference between shortwave and the new LPRTs is that the latter can be heard only within the radius of the community, whereas the shortwave signal, while not as regular in its reception, covers a much greater territory. Many northern people live and work outside their community at different times of year, and many of them are avid shortwave listeners.

Review of 1976-77

On December 18th, 1975, the Northern Service began programming on its newest Northern Radio Network (also called the NWTN). This network uses a separate carrier in one of the television channels (AA4) of the satellite to link the NWT communities of Igloolik, Cape Dorset, Pangnirtung, Pond Inlet, Rankin Inlet, Eskimo Point, Baker Lake, Resolute Bay and Cambridge Bay. These stations, with the exception of Rankin Inlet, use transmitters on the FM broadcast band to broadcast AM programs.

A year later the importance of this new network has changed the role of CBC Frobisher from that of providing a strictly local service to its listeners, to a sub-regional production centre for the eastern Arctic. Approximately 80 per cent of the new audience of listeners in the eastern and central Arctic are Inuit.

The NWTN program schedule is a combination of English and Inuktitut programs as follows: (Programs from the Montreal production centre are fed to Frobisher by satellite and are rebroadcast on the northern network, and vice-versa on shortwave).

(Eastern times)

0600 - 0900	Frobisher
0900 - 1100	Inuvik
1100 - 1230	Frobisher
1230 - 1430	Frobisher (programs from Montreal included)
1430 - 1600	Inuvik
1600 - 1800	Frobisher (including (southern) National radio Network newscasts)
1800 - 2300	(southern) National radio Network programs aired through Frobisher
2300 - 0100	Frobisher
0100 - 0300	Inuvik

The same satellite network which services the eastern Arctic with programs from the aforementioned places, also makes it possible for the first time in history to link all the radio transmitters in the NWT together from east to west. This facility has been used for special programming: i.e. an all-night New Year's program. It also allows the Yellowknife news to be picked up in Frobisher and vice-versa. Previously, news items had to be exchanged

by telex or long distance telephone. As well, Whitehorse has, since February 1977, joined the NWTN, and can complete the 24 hours of programming.

The Northern Service works in close co-operation with national, regional and local native groups. Through this co-operation, the native-language radio programs continue to be enriched.

Coverage is made of the myriad of festivals and sporting events held in the North nearly every year, such as:

- Ice Worm Squirm (Faro, YT)
- Sourdough Rendez-vous (Whitehorse, YT)
- Toonik Tyme (Frobisher NWT)
- Caribou Carnival (Yellowknife NWT)
- Discovery Day (Dawson City, YT)
- Aurora Snow Festival (Churchill, Man.)
- Ptarmigan Daze (Watson Lake, YT)
- Ross River Revelry (YT)
- Northern Native Games (Mackenzie Delta, NWT)

There have always been criticisms of Northern Service programs, particularly from the Yellowknife and Inuvik areas, and especially of its news reporting. The director of the Northern Service, after listening to some of the more recent contentious programs, feels that these criticisms should be seen in the following context:

"Until very recently, there were no professional reporters in the North. Some people are not accustomed to the right of reporters to seek out information, even uncomfortable information.

The North is in the throes of a great debate over the kind, and rate of modernization and development it shall undergo. Traditionally, modern society has simply run roughshod over aboriginal societies. Today, native groups have been funded to present their case strongly and the government is at least listening to them. This has disrupted the plans of those people who looked forward to early benefits from development.

Since the activities of these native organizations often constitute news, they receive regular coverage. This means that there has been a substantial and justifiable rise in the amount of native, and native – organization – oriented programming on stations in the past few years. This is bothersome to some who would prefer criteria other than newsworthiness in news and current affairs programming. Increased programming in native languages, programming that is not translated into English, but is heard by English-lan-

guage people, can annoy English-speaking people.

The North has only recently become highly politicized on such issues as representative government, development, etc. This has brought with it the formation of "sides" which have split families, friendships and even organizations. Since CBC is in the middle of all of this, some of the frustration becomes focussed on us.

Undoubtedly mistakes are made, but those mistakes are always investigated. The northern stations' staff are doing a remarkable job under extremely trying circumstances."

(Extract from an internal report prepared from CBC President, A.W. Johnson, March/April, 1977).

A question which is regularly posed by members of the NWT Government and other northern organizations is: Why cannot the CBC Northern Service have its headquarters situated in the North?

The director of the Northern Service referred to the question during his presentation to the NWT Council in October, 1976, at Rankin Inlet:

"....a request to have the CBC Northern Service headquarters moved to the North. Now, some people living in Frobisher and Resolute would not think that Yellowknife was the North but I think that Yellowknife was the point that some people were considering. That point has been considered and it has been decided in the negative. The headquarters group is a small group that is now dealing very much with not only North of 60° but with mid-Canada and because resources for development in mid-Canada and the North in broadcasting are precarious, the Northern Service has been instructed that the headquarters' group is required in the South for some continuing period of time."

Appendix A - List of Northern Service programs made by and for Native Peoples.

Appendix B - 1976-77 Winter Shortwave Schedule.

Plans for 1977-78

Develop radio news and current affairs programming through setting higher standards, providing training programs to announcer/operators allowing more time for program preparation, and program evaluation.

Help more community radio stations become established. The Northern Service offering basic equipment, administrative advice, training, technical assistance, and access

to the CBC transmitter, if there is one in the community.

Establish a radio production centre in the Keewatin Region by redirecting the resources of the present CBC Churchill production centre.

For a number of years the Northern Service has been trying to serve the Keewatin with program bits via shortwave and satellite from Montreal, Frobisher and Inuvik. This is not satisfactory. As soon as possible a radio service should be established within the Keewatin to take advantage of the facilities of the satellite. For years, the people of the Keewatin have requested a tailored program service. Now that CBC has decided to move on the request, a careful study will be made to decide location of the production centre and the programming priorities. The Northern Service wants to develop a service with the fullest possible local input. The main request from Keewatin residents has been for news about the Keewatin, in both English and Keewatin Inuktitut dialects.

CBC Yukon

There are 14 CBC low power relay transmitters (LPRTs) broadcasting radio programs throughout the Yukon and northern British Columbia. These transmitters are linked to the program production centre at Whitehorse.

Each LPRT signal in the Yukon can be heard only within a 16 km radius of the transmitter. Because of the mountainous terrain, the signal does not carry as far as it does in, for instance, the lower Mackenzie District.

Review of 1976-77

Technical improvements along the Yukon Network this past year were:

- establishment of a microwave link from Galena to Mayo to improve television picture in Mayo;
- completion of new announcer/operator console;
- extension and modifications to radio studios;
- upgrading of radio network facility by Canadian National Telecommunications; and
- replacement of landline with microwave system to carry the Yukon Radio Network. Whitehorse produced about 73 hours of local and regional programs a week. The remaining 60 hours a week were programs from the National Radio Network.

Local actors and writers for drama and comedy spots provided live entertainment.

Survival information, a constant flow of time, weather, community announcements and messages was another daily requirement.

Yukon sports events and local and community festivities were attended by CBC Whitehorse staff and either reported live where broadcasting facilities were possible on-site, or programs were made for later broadcast, e.g. the Farrago Folk (music) Festival in Faro.

Highlights

A sound-on-film camera was used in the local newsroom and major news items were produced for national television.

Top Yukon radio news stories were sent daily to Yellowknife.

Arrangements were made for exchange of a news items with CBC Vancouver. In July, the newsroom moved from across the street to the 2nd floor of the Casca building – another move will be coming later within the building, providing better access to production studios, and administrative and program developments.

Major coverage of a crippling strike at the Yukon's biggest mine (Cyprus Anvil in Faro) was carried out. The strike has far-reaching effects inside and outside the territory. Whitehorse news staff produced several news specials concerning the economic and social impact of the strike.

Land claims was the major topic for radio and television programming.

The Sunday program *Review* produced by Sally Halliday and Cal Waddington, gave analytical summaries and various current affairs issues of the Yukon. Some topics during the year were:

Warren Allmand The new (in 1976) Minister of Indian Affairs and Northern Development created a strong impression during his first visit to the Yukon, with a statement to the Yukon Territorial Council that any further constitutional development would depend on more Native participation in government.

Food in the North Food prices in Whitehorse are on the average 36 per cent above those in Edmonton. A report by Transport Canada stated freight should only add about five to nine cents per pound more in Whitehorse. Many products from Edmonton or Vancouver run as much as 40 cents per pound more in Whitehorse stores. The program *Food in the North*, used the Transport Canada study as a kick-off to talks with food company officials and the Minister of Indian Affairs and Northern Development about a possible investi-

gation into the prices and the food monopoly situation in the North.

Carcross-Skagway Road This 100-mile link from Whitehorse to the U.S. seaport town of Skagway, due to be completed this fall, will mean an increase in tourism and commercial activity to the Yukon. In the program, interviews with bus tour company reps, hotel owners, Chamber of Commerce presidents and trucking company representatives tried to illustrate the economic effects of the road. To date, the old town of Skagway (population 300) has a budget in excess of eight million for improved dock facilities, road pavement, and the marina.

Mining and Development Local politicians argued that land claims are holding up any future mining development. *Review* producers talked with local politicians, and Bob Cathro of Cathro and Associates in Vancouver, who disputed that land claims had anything to do with mining exploration or development in the Yukon.

Merv Miller The assistant commissioner, Merv Miller resigned. *Review* presented an in-depth talk with Mr. Miller, on the inner workings of the territorial government.

Church in Action on Sundays, has replaced the mini-church-service program. At first the program consisted of half music, half talk, and included interviews with visiting and Yukon clergy. Now the emphasis has shifted to involve and interest lay-people to a greater extent. At present *Church in Action* is co-hosted by the Yukon's only Lutheran pastor, Bob Moland, and one of the priests from the Whitehorse Roman Catholic Parish.

Since the program began, Bob Moland has conducted most of the interviews, and items have been used as well from *Northern Exchange* and network syndication (lately re: the Uganda situation). Some items have been done by the producer Pam Buckway. Announcer/operator Jim Blakely prepared and read world church news and took over major host responsibilities in Bob Moland's absence.

Items have included an interview with the industrial (pipeline camp) chaplain in Valdez, Alaska, about the pipeline impact there, and things to look out for in the Yukon, a survey of Christian education (Church School), materials that are available by mail for people in isolated locations; a chat with a family counsellor about bridging the generation gap from parent to teenager; and insight from a local youth group about their third world starvation. Music is limited to one or two specifically chosen pieces.

Yukon Native Voice is produced Saturdays by announcer/operator Kathy Van Bibber.

Interviews have been aired on the Yukon Indian Women's Association. The association was very active and was a member on almost all of the various committees and boards of housing, alcohol, etc. The association was featured on *Yukon Native Voice* last year to stop the exploitation of sacred burial grounds of Indian people in the Yukon. They also lobbied for the banning of the popular song "Squaws Along the Yukon". The Yukon Indian Women's Association is applying to National Health and Welfare for a women's hostel in Whitehorse.

Freelance programmers April Boyd and Henry Mitchell did a series on alcohol awareness. Dr. Don Branigan from the clinic in Whitehorse, was a guest on the program concerning alcohol and its effect on people.

A series was held on VD and TB. Dr. Connolly, medical officer in the Yukon was guest speaker.

Bill Clinch (Chief of the Alcohol and Drug Branch with the territorial government) was a guest on the program discussing the effects of young people sniffing gas. (Whitehorse had a near crisis situation last summer with youngsters sniffing gas).

Over the past year, a series was produced with staff of the Council of Yukon Indians describing their duties. However most of the staff members who were on the series are no longer with the council.

A Foothills Pipeline representative talked to the Council of Yukon Indians ... this was taped and aired. Land claims was a major topic on many programs this past year, and will continue to be in 1977.

A number of native contractors have formed a Yukon Native Contractors Company. The contractors hope that as a company they will be able to bid on large jobs and will not be restricted on the type of jobs they bid for. They received a grant to get started but hope to be self-sufficient in the near future.

A number of profiles were aired on elders from the Yukon Indian population.

Interviews were made with the Teslin Wood Products employees. Previously owned by the Yukon Association of non-status Indians, the outfit now operates on a share basis with the Teslin Indian Band and local Indian people.

Whitehorse Sports broadcaster Terry Delaney was in Montreal providing Yukoners with complete coverage of the McDonald Brier.

(The Don Twa Rink represented the Yukon in the Brier).

He also reported on the 10th annual CBC Bonspiel that was held in Whitehorse the end of November. Rinks were competing from the Yukon, NWT and northern British Columbia. This is the second largest bonspiel in the Yukon. Other curling events covered for the Yukon radio audience were the annual highway bonspiel at Haines Junction, and the Territories Curling Playdowns in Faro.

Reports from many other sporting events held throughout the Yukon were broadcast on the CBC's territorial network.

In arts and variety programming, CBC Whitehorse is a major contributor to *Northern Showcase*, the hour-long weekly program produced in turn by most of the northern and Montreal production centres, and broadcast by them all. Examples from Whitehorse, produced by Cal Waddington, have been:

The Dalton Trail, a historical documentary about the trail from Haines, Alaska, to the Klondike (Dawson City, Yukon);

Agriculture in Yukon; It's a Question of Land.

Probably the most difficult place to get decent farming acreage is in the North. The federal government recently froze all large agricultural land leases until a land policy is derived by the territorial government, who maintain the freeze is a result of land claims. The program producer talked with farmers, those who have proven it possible to make a living from farming in the North, and who came there for a lifestyle on a homestead; and also talked with government officials on what kind of land policy they foresee.

Government for the People by the People

What is government doing for us? What do they see themselves doing? Discussions were taped for the program with various elected members of the territorial government, the past commissioner, James Smith, and people in general. One conclusion that can be made from listening to the program is that the Yukon needs party politics in order to get solid policies voted on, and in order that the federal government should take the Yukon Territorial Council seriously.

Special Programs

What Yukoners Think about Provincial Status — Pro or Con.

An open-line show was aired last fall on this topic with guests including federal M.P. for the Yukon, Eric Neilsen and Senator Paul Lucier, and phoned-in interviews with Con-

servative Party Leader Joe Clark and Indian Affairs Minister, Warren Allmand. The results were:

Total number of listener calls — 65

Number of on-air calls — 33

In favour of provincial status — 6

Against provincial status — 14

No commitment — 13

Number of off-air calls — 32

Producer Cal Waddington recorded an hour-long music and talk program with singer/composer Garry Averill, from Mayo, Yukon, for broadcast on *Northern Showcase*. Interest was so great in the program that the national network show "Morningside" broadcast it.

Garry Averill recorded nine songs in the CBC studios. Apart from using these songs during the program, they were put as well on a CBC northern broadcast recording, and distributed to radio stations and music program producers in Canada.

Carcross Community School, produced by Pam Buckway, was a program which explored the background and objectives of a different concept of education, through interviews with parents, students, teachers and the Bishop of the Anglican church (which is the sponsoring body of the school), situated in Carcross, Yukon.

Klondike Mike was a dramatization, based on the book written by Merrill Dennison about a colourful Yukon stampeder. Co-produced by Les McLaughlin and Cal Waddington in Montreal studios, it is the story of Mike's trip to the Yukon during Gold Rush Days.

Nostalgia A 90-minute special on the history of the 1950's rock and roll which consisted of 50's music and conversation between Cal Waddington and Buddy Knox of "Party Doff fame".

Plans for 1977-78

Structural modifications to the Casca building will be completed.

CBC Yukon radio will be broadcast on a channel of a local Whitehorse cable system.

Seven transmitter sites will be replaced throughout the territory.

Development of selective split feed (tailored) programming to specific communities in the Yukon and possibly in northern B.C. This may be accomplished by remote telephone access (now being experimented with), whereby a feed of programs from Whitehorse could be made to specific LPRTs.

A dramatization called *Yukon Trophies Won and Lost*, and a music program called *Fiddler on the Loose* featuring local fiddler, Joe Louchan, are planned.



This White Pass and Yukon route train car was loaned to CBC Whitehorse during the Sourdough Rendezvous.

A news special is being planned for radio on the Yukon Land Claims issue.

Plans are being developed for special coverage of the Alaska-Canadian Route Pipeline hearings to be held throughout the Yukon in

the early summer of 1977. This special coverage will require another news position.

In public affairs, CBC remains in a position where it, more often than not, reacts to an issue or situation. Instead, it would be more

valuable to Yukon listeners if, with additional funds, more advance research and origination of public affairs programs could be carried out, e.g. make a study of some of the ordinances passed in council: real estate agents'

licensing, insurance, land use. How do these issues affect the lives of Yukoners? Put the program content in man-in-the-street terms. Right now bureaucrats and politicians assume the public already has the knowledge behind everyday issues. The CBC could ensure that is does.

More *Open-Line* shows to supplement and support public and current affairs programs. Future Review Program Subjects

Northern Policy-Making Who makes decisions on pipelines, mining development, transportation corridors — i.e. big development in the North? Ten years ago, the Yukon experienced a boom in mining development, road construction, services, housing, mostly because of federal incentives. What is happening now, in a climate of pipeline development? Is the policy, or non-policy of wide — open development dying out? Six mines in Yukon cannot go into production at present, because of lack of hydro-electric power, which the federal government controls in the form of the Northern Canada Power Commission.

Northern Teacher Training Program The territorial government has budgeted more money for the NTTP in the hopes that northerners will stay in the Yukon to be educated.

Future Plans for Yukon Native Voice

Get more native input into regular programming.

Put together a complete package of the pro's and con's of Indian issues and concerns (examples: Land Claims, Education, Justice, Housing).

Encourage Indian people in outlying communities to participate in Yukon Native Voice.

Specials planned for 1977-78

Production of four or five documentaries. Further development of local talent, broadcast recordings and radio drama. This latter will involve a play to be written, and produced with a cast of Yukoners.

CBC Yellowknife

The Mackenzie Network was comprised of a radio program production centre at Yellowknife, and nine other community stations on the Upper Mackenzie River Valley as far North as Wrigley, the communities surrounding Great Slave Lake, Fort Smith, and as far south as Fort Chipewyan in Alberta.

The Mackenzie Valley Pipeline Inquiry was the single most important event in the history of Mackenzie Network coverage, spanning a 20-month period and employing a special 12-person coverage team. The team, formed in

1973 and based in Yellowknife, was made up of reporters hired in the territories, or seconded from the Yellowknife station. A cameraman was hired from the south. Both radio and television reports were made throughout the hearings in eight languages and dialects (English, Loucheux, Slavey, Chipewyan, Dogrib, Hareskin, Inuvialookton (western) and Inuktitut (eastern).

Review of 1976-77

Yellowknife produced 71 hours a week of local and regional radio programs of which about 13 were in the Dene languages of Dogrib, Slavey, and Chipewyan, and half an hour a week broadcast in Cree, produced by the Alberta Native Communications Society. The remainder of local and regional programs were in English, as were the 62 hours a week of national network radio programs broadcast on the Mackenzie Network.

News formed an important part of the local and regional programming. For instance, the *Territorial News* carried items from the Delta, the central Arctic and the Baffin region, as well as from the Mackenzie District.

A weekly sports program gave results and news of future events. The program was produced from Yellowknife but relied heavily on telephone reports from stringers in the Mackenzie District.

Detailed coverage was made of the major decision-making meetings, regional conferences, and other events held in the district.

Amongst these were:

- Territorial Council
- NWT Water Board
- Indian Brotherhood of the NWT
- High School (debates)
- Métis Association
- NWT Municipalities
- Chamber of Commerce

Highlights

Focus North, a daily current affairs program primarily addressed itself to issues relevant to the Great Slave Lake area, and from Fort Chipewyan to Fort Smith to Wrigley. However, the program also broadcast issues concerning the rest of the Northwest Territories. If CBC Inuvik had an issue to report, the item was sent to the *Focus North* producer and broadcast throughout the Delta via CBC Inuvik. CBC Frobisher may carry the program and through occasional contributions, will gain a territorial outlet for some of its own issues. The program was fed from Yellowknife to Inuvik and on the Northern Radio Network.

A drama *The Raven's Legend* was produced by announcer/operators Bonnie Dickie and Liz Hay, and contributed to *Northern Showcase* for all CBC northern locations.

A documentary produced by announcer/operator Wayne Collins, on alcohol abuse, was also aired on *Northern Showcase*. The program took, as described in the introduction, a "sobering" look at the problem of alcoholism in the NWT. Interviews with alcohol education workers, detoxification centre staff, and politicians were featured as well as dramatic sketches by the Yellowknife Drama Society. Preparation and production of the documentary took over a month.

In April, 1976, the format for *Gather Round* (the Saturday Country Music request show) was revised to establish the program as a native-language information and music request show. The music content remained dominant, but the program was used to develop information ideas in co-operation with the NWT Métis Association. Announcer/operator Sharon Carpenter produced the program which she hosted occasionally as did members of the association, in Chipewyan, Dogrib and Slavey.

In May, the *Dene News Service* was expanded and improved for hour-long daily broadcast every weekday morning on the Mackenzie Network. The programs contained major news items and information and were gradually expanded to include general community news.

Each item and story was prepared in the relevant language (Chipewyan, Dogrib or Slavey), after initially being discussed among the reporters in English. Very little direct translation was made from English-language copy. Some music was included in the programs which were produced and hosted by Celine Mackenzie, Evelyn Cook, and Lorraine Doctor.

Special Programs

Newsman Al Baxter accompanied the NWT commissioner on a 10-day trip to the High Arctic, concerning the new education ordinance.

News editor Whit Fraser travelled to Washington, D.C. to cover American pipeline hearings. On his return, he produced a half-hour special broadcast.

Freelancers Linda Sorenson and Donna Laing presented a special consumer series on private house building and buying. The programs were combined with an open-line facility for public participation.

Plans for 1977-78

The new CBC Yellowknife plant, to become operational during April/May, 1977, will have the latest equipment and increased space, both of which will further enhance radio programming, and give opportunity for the gradual development of television production in the North.

Some of the constant complaints from listeners to the Mackenzie Network are that there is:

- too much English-language programming on-air in the native communities;
- too much talk, not enough "temperature, time and top ten";
- too much native-language programming on-air in Yellowknife;
- too many programs oriented around the Yellowknife area, not enough balance of programming heard in and from the LPRT communities;
- certain native-language programs are carried too late at night to be generally listened to.

Some of these complaints can be dealt with effectively by tailoring the entire local/regional radio program service to and for both the City of Yellowknife and surrounding area, and all the outlying communities within the Mackenzie Network's broadcast constituency.

- Other developments will be to:
- develop local talent, i.e. writers, broadcasters, comedians;
- record the histories and stories of the district before so many of them are lost; and
- cover northern sports more widely and in greater detail.

New or expanded programs

Travel North a holiday program geared to tourist and resident travelling in the Mackenzie District. The program advises travellers of road conditions, points of interest, time checks, weather and game information etc.

Radio Noon containing updated and augmented information presented earlier on the morning show. A more relaxed pace would be used providing greater opportunity to report on community interests together with network news, syndication items and light music. It could also include consumer information, and territorial news in English, Dogrib and Chipewyan and would be carried on the Northern Radio Network (AA4).

A Dene-language *Open-line* show is being considered.



Exterior of the new plant for CBC Yellowknife, NWT

CBC Inuvik

Delta Network broadcasts are heard from Sachs Harbor, NWT in the North, to Coppermine, NWT in the East, to Fort Norman, NWT in the South, and to Old Crow, in the West. The program signal is received in 16 communities regularly where there are transmitters, and with varying degrees of regularity where reception is off-air.

Review of 1976-77

CBC Inuvik produced 70 hours a week of local programs in Inuvialookton, Loucheux, Hareskin and English out of 133 hours broadcast to the Delta Network. The other 63 hours broadcast were from the National Radio Network.

Since December, 1976, another 20 hours a week were produced in Inuktitut especially for

broadcast on the Northern Radio Network on AA4.

The major purpose of local programs was coverage of local and regional current events and news in English and the native languages and dialects. An invaluable service to listeners in the Delta were the messages and public service announcements which total about 8000 to 9000 each month.

During the year, CBC Inuvik's native-language programming was further developed and expanded with the hiring of four new, full-time native-language specialists in Loucheux, Hareskin, Inuktitut and Inuvialookton.

A 90-day training-on-the-job program was set up at the production centre and met with much interest and some success. The aim of the program was to encourage newcomers to become interested in broadcasting as a career.

Roman Melnyk and Stuart Robertson of the CBC Ottawa legal counsel head office conducted legal seminars for CBC at several northern locations. CBC Inuvik had a group of 12 at their seminar, which was most informative.

Highlights

1976-77 was the first year CBC Inuvik had a reporter/editor on staff. The year was an extremely busy time for newsman Larry Sanders, who "broke" many national stories and travelled extensively to background his regional and local reports; for example;

a four-day tour with the Beaufort Sea Advisory Committee and Arctic Waters, Oil and Gas Study Group;
a one-week tour on Justice William Morrow's final court circuit of the Arctic, before his retirement;
coverage of the annual Inuit Tapirat of Canada meeting at Fort Chimo, Quebec.
CBC covered the week-long Territorial Council Sessions, in May. Daily half-hour summaries were aired from Inuvik in all languages. The Council meetings held in Yellowknife, January/February, 1977, were covered for CBC Inuvik by Sarah Ann Gardlund and Ishmael Alunik. Reporters from other CBC stations also made summary broadcasts.

Reports from seven Mackenzie Delta communities were co-ordinated by announcer/operator Louie Goose when spring breakup started early (May) on the Mackenzie River.

In *Sports*, announcer/operator Jarl Ormholz Jensen attended the *Top of the World* Ski Championships and originated reports for CBC Inuvik, Yellowknife and Whitehorse.

Announcer/operator Roger Gruben represented the Northern Service at the National Sports Conference in Toronto.

In November, *The People Speak* (Inuit) was expanded to two hours. The program features short information items, phone-in/phone-out to Inuit settlements, exchanges of personal and family greetings and messages, religious expression in word and music, along with other material of interest to Inuvialookton-speaking people throughout the NWT, (a potential audience of 14,000 now that the program is broadcast on the AA4).

In December, location manager Bob Rhodes and supervising technician Dave Boudreau, were in Fort Norman while installation was made of a local loop between the local CBC LPRT and the newly established community radio.

Yesterday Before, a program new in 1976,

consisting of a weekly half-hour oral history series in English, drew overwhelming public response. Based on the premises that "you'll know the country if you know the people", this series has done all the things CBC has always hoped radio could do: made CBC staff see other people in a different perspective; educated listeners (history, geography, sociology); provide entertainment. CBC kept a valuable collection of taped material including the only live English-language history of the Delta area. The same applies to the oral history series *A Long Time Ago* in Inuvialookton, Loucheaux and Hareskin, which has been broadcast for a number of years.

Special Programs

Announcer/operator Ishmael Alunik covered the three-day meeting in Sachs Harbour, of the Board of Directors for the Committee for Original Peoples' Entitlement (COPE).

The program *The People Speak*, normally produced by CBC Inuvik, originated in Aklavik and was broadcast as separate entities for the Inuvialuit and the Loucheaux peoples of the Delta in their languages. Announcer/operators Louie Goose and Ishmael Alunik produced, as well, a two-hour *Afternoon Information* program from Aklavik, with the studio end of the remote handled by announcer/operators Ken Look and Barry Burgess, and the technical aspect by maintenance technician Jim Proctor.

On another occasion, the Loucheaux program of *The People Speak* was broadcast from Fort McPherson, and a special two-hour *Information Program* from the Fort McPherson Employment Office, was followed by a three-hour special *Music and Information* program on a separate link to the community. Announcer/operator Roger Gruben produced the programs. Freelancers Niel Colin and Susie Huski hosted *The People Speak*, and supervising technician Dave Boudreau worked out the mechanics.

CBC Inuvik sponsored the *David Essig Concert* in late September in Tuktoyaktuk and the *Ryan's Fancy/Stringband Concert* in Tuk, Inuvik and Aklavik in March. Programs made from both concerts were broadcast over the Delta Network and also contributed to *Northern Showcase*. These were highly successful ventures in bringing well-known artists to some of the more isolated communities not usually on concert tour routes.

A half-hour special program in English and Inuvialookton was made with COPE President Sam Raddi, on the Western Arctic Land Claim

to be made separately from the Nunavut Land Claim Proposal presented to the federal government by Inuit Tapirat.

A special phone-in program was broadcast in English and Loucheaux on the liquor control question in the North.

Three special reports and an hour-long information program was broadcast on the Norman Wells, Aklavik and Inuvik municipal elections in December.

Six and one-half hours of special Christmas programming was aired in Inuvialookton, Loucheaux and Hareskin, featuring messages, carols and greetings from all communities. Also obtained and broadcast was a half-hour of Christmas material in Inuktut by former eastern Arctic people now living in the West.

Plans for 1977-78

A continuing major project of the Inuvik Production Centre's programming will be the oral history series in English and the three native languages and dialects. This series has recently been increased to half an hour a week in each language.

Improvement will be made in the current affairs content of the *Morning, Noon and Afternoon Information* programs;

Improvement of native-language *News* and *Current Affairs* programs which need more staff and proper training will also be affected.

Expansion of the English-language *News Service* will be made where more people and money are required to fulfill the need for better coverage of the Delta.

CBC Churchill

The original radio station was put on the air in 1949 by the Royal Canadian Corps of Signals, soon after the Canadian Army assumed administrative control of the Arctic Test Centre, established by the U.S. Army. In 1953, the U.S. forces based at Churchill, helped to re-equip the station with a 250-watt transmitter and new studio equipment. By 1958, technically expanded with more equipment from the U.S. Army, the station was broadcasting 24 hours a day. CBC took over in 1959 when the local population totalled about 5 000 and consisted of two major communities, the Port and the Fort.

Now, in 1977, the Port (town) area has been vastly rebuilt, and the Fort has been all but closed down, CBC being one of the last residents. The total population served by CBC in the area is about 1 677.

Over the years, CBC Churchill covered the activities of the Fort and Port, as well as

those of a variety of government and scholastic institutions that existed in Churchill to serve the nearby Keewatin District. With the move of these institutions into the Northwest Territories, many programming requirements indicate the need to move the production capability north, as well.

A careful study is being done of the programming requirements and of the choice of community in which to locate the new production centre. This study will include public meetings to be held in the Keewatin communities affected.

The radio production facilities in Churchill may be moved into a community in the Keewatin District. The Churchill radio transmitter would remain in place and CBC would ensure that the community would continue to receive appropriate programming. This could be achieved by CBC Manitoba tailoring its northern programming to include more Churchill material. Some Churchill local announcements are already being carried now, and these and other types of programs are broadcast to the community from noon to two p.m. and four to six p.m. Monday to Friday.

Also, should the people of Churchill organize and take responsibility for some kind of volunteer local programming, the CBC will leave equipment behind to help them out, and assist them with training. Public hearings will be held in May, 1977, in Churchill, to discuss the changeover; and in order that Churchill citizens will be able to express their program requirements.

Due to the uncertain future of the CBC station at Churchill, and the possibility of it being changed to an unattended radio relay transmitter, there has been an unusual turnover in staff in all departments. An area of concern that has been closely maintained is staff morale and invaluable support to keep this morale as high as possible has come from the offices of the Northern Service Director and Human Resources.

Review of 1976-77

A supervising technician made a number of trips to Rankin Inlet to repair problems in the community radio station's audio signal, and to move the CBC's AM radio transmitter into another more accessible building.

Dismantling began of buildings in the Fort area where the CBC Churchill radio plant is housed, and the manager was informed that the steam heating supply to the Fort would be closing down in September, 1977.

Technical changes were made to the radio control room with the transfer of mounted

tapedecks from racks to individual mobile units.

An LRPT 50-watt transmitter was installed as back-up for the station's 250-watt transmitter.

Churchill produced 58 hours a week of local and regional programs in English, and Chipewyan. A weekly half-hour information program produced in Cree and English by the Native Communications Inc. of Thompson, Manitoba was also broadcast. About 75 hours a week were broadcast from the National Radio Network.

Broadcasts were aimed at the non-native and the Metis, Cree, Chipewyan and small Inuit population of the town of Churchill. Since 1973, a large number of Chipewyan people have returned to live on the land, away from Churchill where they had been brought some 20 years ago. One settlement, Tadoule Lake, with now some 200 residents, is too far (257 km from Churchill) to be reached by the broadcasts.

Few new programs were initiated in 1976-77. Emphasis was placed on the quality of existing programs and possible improvement through innovation, training courses for staff, and evaluation of productions.

Highlights

Morning Radio, hosted by Joe Novak till he was appointed manager, and then by announcer/operator Eric Forbes, was streamlined to provide more relevant information supplemented by three local items per program.

Radio Noon, hosted by announcer/operator Brian Crispin, was reduced to one hour with an additional hour providing northern Manitoba regional programming from Winnipeg. *Radio Noon* became more of a basic information program with local news, weather phone-out, regional news, local sports, tradeo and community announcements.

Roundabout continued to be a basic magazine-type program, providing indepth interviews in current affairs and human interest situations. Announcer/operator Keran Stairs was host of the show.

The Chipewyan Program of messages, announcements, stories, legends, local news and music, continued throughout the year with a change of host in September when Suzanne Tom returned to school in Winnipeg. In addition to contributing items to *Northern Exchange*, a number of interviews were used by CBC Winnipeg on their morning program. Among other contributions to northern re-

gional programming were several productions to *Northern Showcase*:

The redevelopment at Churchill
Northern Survival
The History of Churchill
Industry in Churchill (Pre-fab Materials
Plant Opening)

Phone-in Shows: Should Churchill be the site of a new Penitentiary?; and What is the Future of the Port?

Programs and reports were made on: local elections as well as the pre-election candidates meetings; town council meetings; launching of a rocket by Pan-Am Airways; polar bear sightings; adverse weather conditions; and the Great Churchill Turkey Race.

Announcer/operators Jim Boyles, Keran Stairs and Eric Forbes produced a half-hour Remembrance Day program, in addition to the live broadcast of the Churchill Legion Service at the town theatre.

In November, the acting manager, Joe Novak travelled to the Indian community of Tadoule Lake to seek reaction to CBC Churchill's Chipewyan programming. The Indian people were enthusiastic about the idea but cannot pick up the radio signal clearly.

Churchill announcer/operators Keran Stairs and Louie Goose from Inuvik made a one month's exchange of jobs.

The weekly, local news review format was altered to include indepth analysis of top series, as well as a report of stories heard during the preceding week.

Special Programs

In April, 1976, announcer/operator Chuck Regehr provided "live" coverage from the pre-fabricated materials plant's open-house, and from Port of Churchill open-house.

Freelancer (and former CBC Churchill announcer/operator) Don Lane produced a Special New Year's Day program on musical groups in Churchill.

Extensive coverage was given by CBC Churchill announcer/operators to the Annual Aurora Festival and official opening on April 24th, 1976, of the new town centre complex. About 200 out-of-town guests flew in on chartered aircraft to attend, including the Premier of Manitoba, and several provincial and federal ministers. CBC broadcast live from the complex from 7:00 a.m. to 6:00 p.m.

Announcer/operator Jim Boyles accompanied the local Canadian Forces Station training unit in November on an Arctic Winter Warfare Course.

For a two-week period in February, 1977,

20 community leaders produced and hosted *The Morning Show* (with technical assistance from CBC Churchill). Hosts included the bank manager, health centre director, Canadian Forces Station Commander, school principal, RCMP Constable, members of the Clergy, the local Métis President, a northern housing official, 10 people in all who appeared to have enjoyed the experience, as did their audience from the feedback received.

Other community-type broadcasting was made by local residents using station facilities on Wednesday nights for just over 90 minutes up to midnight.

Each year, someone in Churchill has a brush with the local wildlife, and this past October, CBC Churchill almost had a new host for *Morning Radio*. It seems that when announcer/operator Eric Forbes arrived for work, he was greeted by a polar bear waiting by the front door of the station. Mr. Forbes politely refused the bear's offer to accompany him inside, claiming it was contrary to his union's collective agreement.

Plans for 1977-78

The future of the CBC station at the Fort will be decided in the next year. A town meeting is scheduled for May, 1977, and a hearing before the Canadian Radio-Television Telecommunications Commission in Winnipeg has been postponed from June to, tentatively, December, 1977.

CBC Churchill programs to be expanded: late-night record music show broadcast once a week, with production by a member of the local community; *Houseparty*, a three-hour musical variety show is to have four special remote broadcasts in conjunction with local events or seasonally celebrated occasions; *Roundabout* will become a complete, community-oriented magazine package featuring local interviews relating to community events and issues. Also featured, will be local and National Radio Network news, a weather phone-out, syndication items, and community announcements. CBC Churchill also plans to have an announcer/operator visit communities south of the town on the railroad line, to gather material for local broadcast use, or for CBC Winnipeg or the National Network.

New programs planned include a series on the history of Churchill; two-hour phone-in special on local education; *The Good Old Days*, a program on the history of the town and its people; and *A Northern Showcase*

contribution on the Health Centre Conference, to be held in April, 1977.

CBC Frobisher

Until 1976, CBC Frobisher radio broadcasts were aimed at the surrounding community and the Village of Apex, about three miles away. Some Frobisher programs were sent to Montreal on tape to be fed to the shortwave plant at Sackville, New Brunswick and transmitted back up to the North.

Since the station went on-air in 1961, the local Frobisher signal can also irregularly be received off-air in many other Baffin communities without CBC transmitters, and in northern Quebec.

In 1976, a new satellite distribution system was inaugurated to and from Montreal and Frobisher to speed up program exchange. As well, CBC Frobisher became a distribution and receiving point for programs on the Northern Radio Network (AA4).

The population of Frobisher and Apex is 2 300, about 1 300 Inuit, 800 whose mother-tongue is English, and about 200 whose mother-tongue is French, Italian, Greek or other. With the link-up of the AA4, some of Frobisher's programs can now be heard by an audience of about 5 300.

Frobisher co-ordinates all modifications to the Northern Radio Network. The basic schedule of 147 hours a week (not including CBC Whitehorse) was set up at a meeting in September, 1976, between the managers of the stations at Inuvik, Frobisher and the presentation officer from Montreal Production Centre. (The schedule, and more information about the AA4, are given in the radio section of this report). The broadcast constituency of the Northern Radio Network is north to Resolute, south to Eskimo Point, west to Cambridge Bay, and east to Pangnirtung.

Review of 1976-77

Frobisher broadcast about 74 hours a week of local Inuktitut and English-language programming, including some of the Inuktitut programs produced by the Montreal Production Centre, Yellowknife and Radio Greenland which were also broadcast on Shortwave and the Northern Radio Network. The station contributed some of its local programs to the 147 hours of regional programs broadcast by satellite each week on the Northern Radio Network of ACP-installed stations in isolated communities. Programs from the National English Radio Network were broadcast locally

during 59 hours a week, including one program from the French National Network.

It is interesting to note that as the Inuit have developed a strong interest in preserving their language and culture, CBC Frobisher has increased its weekly hours or programming in Inuktitut from about 19 hours a week in 1972 to about 43 hours a week in 1977. (Some English language inserts occur in the 43 hours).

A list of the Inuktitut-language programs broadcast by CBC Frobisher is given in Appendix A.

"Inuktitutisation" of the CBC Frobisher production centre and its programs took place rapidly over the past year to the point where, the working language of the production staff is approximately 75 per cent Inuktitut to 25 per cent English. Because of the speed and lack of community consultation with which this took place, there was justification for some of the non-Inuit complaints received: e.g.

cancellation without consultation with local listeners of the only French-language newscast "Le Monde Maintenant", at Noon, Monday to Friday; and not replacing it with something comparable at some time during the daily program schedule. This action raised a storm of protest locally and letters of complaint were sent to the CBC Executive Vice-President, the Director of the Northern Service, and copied to Federal Language Commissioner Keith Spicer. Discussion took place between Dr. Levesque, representing the French-speaking people of Frobisher, and Peter Baril, manager of CBC Frobisher. About two months after cessation of the program, Mr. Baril arranged for a longer and more complete newscast with additional reports and interviews to be broadcast at 9:00 a.m., Monday to Friday ("Le Monde ce Matin"), and wrote to Dr. Levesque confirming their discussion and his program plans. (There is also a five minute daily (Monday to Friday) weather forecast in French). Further consideration will have to be given to this matter of French-language broadcasting in the Frobisher area. At present, "Le Monde ce Matin" is the only French-language program broadcast on CBC Frobisher.

The community broadcasting station at Pangnirtung went on-air on April 4, 1977. CBC staff at CBC Frobisher were deeply involved in initiating Pangnirtung to broadcasting: the manager negotiating the formal agreement for access to the CBC transmitter (after a trial run of using it), the technicians

taking in the equipment, installing it and providing training in its use, senior announcer/operator Jonah Kelly training the local people in announcing, producing programs, and augmenting what they have already learned about operating the equipment.

This procedure of community radio assistance by CBC staff is given from all the program centres in the North except Whitehorse. Maintenance is carried out on an on-going basis by the nearest CBC manned station.

Following the Community Radio Workshop in November, 1976, and CBC's involvement in dubbing community tapes for exchange as described under engineering in this report, the first CBC Frobisher newsletter was sent out in February, 1977 to the delegates who had attended the workshop. Other newsletters will follow from time to time.

Establishment of a newsroom in 1976 was a long-awaited achievement. Editor Rick Grant was put in charge of building the news service from scratch and by the end of March, 1977, there was a degree of thoroughness and familiarity with the production centre's broadcast constituency and audience. A second English-speaking news editor, Daniel Page, was hired for the newsroom. About 20 newscasts are now produced daily.

Highlights

Quite a number of Inuit meetings and conferences were held in Frobisher and covered by CBC including those for NWT Government Interpreters; Northern Housing; Community Radio Workshop; and the Baffin Region Inuit Association Board of Directors.

Staff turnover in the northern stations is frequent due to a variety of reasons. To help overcome the trauma of integrating each new member, some of the CBC Frobisher personnel have been working on manuals: i.e. announcer/operator operating and technical trouble shooting; and a similar one for switchboard receptionists and confidential clerks.

The Northern Television Service buys and telecasts a program series from the local Super-8 film workshop group — Nunatsiarmiut. After the programs are reproduced onto 3/4 inch videotape and before they are shipped south to CBC for telecast, they are screened by CBC Frobisher radio announcer/operator Ilisapi Davidi, and checked for possible libel.

The Sikumiut Band (quartet) were taped for broadcast recording while they were in town for a major concert.

Housing problems have been developing in

Frobisher which greatly affect CBC staffing. For instance, establishment of the newsroom was held up early this past year due to lack of accommodation in the hamlet. By about mid-1976 the situation eased, but the future increase in housing for CBC staff will have to be planned very carefully.

Plans for 1977-78

Frobisher will be assisting the community stations at Pond Inlet and Cape Dorset to go on-air; Pond Inlet in the spring and Cape Dorset later in 1977. Newscasts in Inuktitut reported by an Inuk editor will be incorporated. Better coverage of events in northern Quebec which are of increasing interest to the Inuit of the Northwest Territories will be provided through stringers. The CBC Yellowknife program, *Focus North* will be contributed. New Inuktitut program blocks will be filled with good quality content.

Program proposals are to: Commission the Baker Lake Radio Society to produce a new weekly half-hour program *Inummarit*, which will give tips on both traditional and present-day technology of northern survival; from how to make animal skin harnesses for dog teams to improvisations on skidoo parts during isolated breakdowns; animal habits, hunting and game stalking; and types of ammunition; and to institute an Inuktitut drama series which would double as language instruction: one might be a suspense serial with cliff-hangers linking each episode, and another might be a series reinforcing laws, health and institutional services.

CBC Montreal Production Centre (MPC)

Television

The weekly Inuktitut-language information program series *Tarqavut* is produced in Montreal in co-operation with and using the facilities of the French Services Division. The programs are produced by Marie Tessier-Lavigne of the English Services division, Montreal, and are hosted by Northern Service Inuit broadcasters, who produce and broadcast radio programs for transmission to the North from the MPC. The series began in 1973, five minutes a week, and has since increased to 15 minutes a week, telecast on Fridays at noon and repeated at 6:00 p.m. eastern time.

The content of *Tarqavut* is usually pan-northern in nature, covering culture, history,

science and the social/political developments in or relevant to the Circumpolar North.

Television program promotion in Inuktitut is given daily in a voice-over slide presentation using Northern Television Service program notes and other sources, to describe special interest and daily programming. This promotion information is prepared in advance at the Montreal Production Centre by Inuit broadcasters, and fed to Toronto for northern transmission via satellite.

Radio

A production centre for the Northern Service was set up in 1960 in Montreal because facilities were available for recording National Network programs for shipment north. At that time, the northern stations were dependent upon tape-delay National Network programs. Between the installation of the first, manned CBC station at Whitehorse in 1958, and 1960, and as more locally-operated radio stations were taken over or new stations established, the need for a centre from which to record and distribute the National Network and other tapes, became apparent.

The actual Shortwave Service to the North, scheduled from the MPC and transmitted from Sackville, New Brunswick, began in 1958, and broadcast initially for eight and a half hours a day on 50 kilowatt transmitters through makeshift use of the South American antenna arrays. In November, 1973, construction was completed on antenna arrays especially directed to the North, and fed by 250 kilowatt transmitters.

The hours of broadcast increased to 19 a day in English, French, Inuktitut and Cree. The audience aimed at by the northern shortwave broadcasts did not, and to a lesser extent, still does not have access to the programs of local CBC stations. In 1977, about 11 600 people live in isolated, unserved communities in Labrador, northern Ontario, northern Quebec, and the Northwest Territories. It is towards this potential audience, that the northern Shortwave Service is directed.

Review of 1976-77

The Montreal Production Centre maintained its liaison with the Armed Forces Service until November, by which time all components had been integrated back into complete service transition and Radio Canada International had control.

Early in 1977, the director of the Northern Service initiated a study to be carried out by communications consultant Heather Hudson.

The terms of the inquiry were to: evaluate the need for southern production for the Northern Service; and to examine the future requirements for Northern Service Shortwave distribution.

The study was completed at the end of 1976-77, and the recommendations have yet to be fully considered.

Television

Tarqqavut is going into its fourth season and still remains the only Inuktitut-language CBC program the Northern Service can afford to produce, (even with the continuing use of CBC Montreal regional facilities) weekly. Financial resources are not available at present to increase production. Examples of guests and issues on the program were:

a new singer from Payne Bay, Quebec; missionary work in the North discussed with Canon Noah Nasook of Igloolik, NWT; presentation of the Inuit Land Claims Proposal "Nunavut" to the federal government; the contemporary spirit of Christmas and the way it was celebrated in the North in the old days; the Native Heritage Exhibition; launching of a new satellite; a new minister for DIAND; land use project; administration of the National Parks; the Northern Game; a conference of the Polar Regions; the marketing of Inuit Art; the visit of the Governor General to the NWT; Oil in the Arctic; Inuit Fashion; the Olympics; Operation Survival; and an exhibition of the pictures of the late Peter Pitseolak.

Broadcaster/producer Elijah Menarik was host on the experimental Super-8 film *Native Heritage* (described) under the main television section of this report.

In January, 1977, announcer/producer Moses Novalinga took part in a National Network program "Cross Point" in which he had discussions with young Inuit who are studying in the south.

Radio

The Montreal Production Centre supplies a daily shortwave service to the North as well as additional program material to augment programming broadcast from the CBC's northern locations.

The Shortwave schedule is composed of about 33 hours weekly of Montreal-produced programs, 10 hours of regional contributions, and 90 hours taken from the national French and English radio networks. A printed schedule is published twice a year, usually illus-

trated on one side, and is distributed widely to listeners both in Canada and abroad.

Some complaints about the Shortwave service have been received during the past year; Not enough Native-language programs broadcast on Shortwave, especially on weekends;

The change in the time of the phone-in show is not convenient to many Inuit, especially to those working in (fixed lunch-hour time) government jobs or for private companies;

"Please stop switching the frequencies around, we cannot find you".

Poor reception in various places in the North at different times of the day and year.

The latter is almost impossible to overcome because, like Shortwave anywhere, reception is subject to many atmospheric and other disturbances. Canada has the additional hazard of the auroral zone which results in a large absorption of radio signals, and at times, will cause radio "blackouts".

The changes in the northern frequencies, say in the middle of any program season, is very disruptive to the audience. The allocation of frequencies is under the control of international frequency co-ordinating groups and while the CBC Northern Service is represented on the groups, its views are not always accepted.

The phone-in show *Isumavut*, will be returned to its former time (see Plans for 1977-78, later in this section of the report). The program began broadcasting in March, 1974, and has had strong Inuit support and participation. Some of the topics discussed over the air during 1976-77 were:

unemployment; the future of Air Inuit in northern Quebec; the RCMP; school children away from home, school drops-outs, education in general; development in the North, happiness — before and after; housing; language; co-operative federation; hunting licenses, news service; television; and capital punishment.

A study was made during the period June/July, 1976, on the number of calls (reversed charges) made to the program, their duration, and origins. Statistics were as follows in totals: 177 calls from 21 communities in the NWT, northern Ontario and Quebec, taking up 28 hours. In November, 1976, *Isumavut* began using conference call equipment to promote the open-line debate/discussion with Inuit wherever they called in from.

Cree-language programming on Shortwave, began in late 1973 with *The Cree Speaks*,

and *The Cree News*. In April, 1974, *The Cree News* was added to the broadcast schedule of the Quebec Community Network serving a series of 17 English-language LPRTs North, North-East, and North-West of Montreal and Quebec City. In October, 1975, *The Cree Hour* began on Shortwave, and a month later all the Cree programs were added to the English and French-language transmission schedule distributed by satellite to the first two LPRTs installed (under the Accelerated Coverage Plan) by CBC, in Nouveau Comptoir (Paint Hills/Wiminji) and Fort George, northern Quebec.

The Montreal Production Centre has plans but no resources to increase Native-language programs to and in the North.

The Cree and Inuktitut-language Programs Broadcast on Shortwave are listed in detail in Appendix A.

The Inuit Cultural Institute at Eskimo Point, NWT, advised the MPC in December that they would be prepared to represent developing Inuit composers and musicians in securing membership in performing rights societies. CBC considered this a great step towards putting northern artists on a fully professional recording and royalty income footing. Northern Service history in broadcast recordings has been:

In 1973, CBC produced two 45 rpm records for northern sale, recorded by Charlie Panigoniak accompanied by Mark Etak. This duo is very popular in the North. They come from the Keewatin Region, and to CBC's knowledge had not made any saleable recording before. The initial pressing of 1000 records were sold out very quickly, as was a second pressing of 1000.

In 1975, the Northern Service produced the second pair of 45 rpm records for northern sale; the Sugluk Group from Sugluk, Quebec. An initial pressing of 2000 records was made of which few remain.

The idea behind making these records available for sale on a limited supply basis, was to gain a wider public awareness of the fact that there are excellent northern entertainers. Basically, the records were sold only in the North.

Eighteen months ago, the Northern Service decided not to sell any more records, but instead, to encourage northern artists, both native and non-native, to make broadcast recordings. Artists so far recorded are:

Etalu (Cape Dorset, NWT), Susan Peta (Pangnirtung, NWT), Jopi Arnaituk (Wakeham Bay, Quebec), Tummassie Quis-sak (Povungnituk, Quebec), Charlie Panigoniak

niak (Eskimo Point, NWT), Garry Averill (Mayo, Yukon), Alexis Ut'a-naaq (Baker Lake, NWT), The Sikkumiut Band (a quartet from Povungnituk, Quebec), Mark Papigatuk (Payne Bay, Quebec), Morely Loon (Paint Hills, Quebec), Wilf Bean (Inuvik, NWT), and Bill Tagoon (Baker Lake, NWT).

500 45 rpm records were pressed of each recording. A quantity were sent to North American and Canadian radio stations, and to people who talk about music on radio, television or in print. A number were given to the artists themselves, who were also paid a fee by the CBC for recording. Also, whenever the music is played on-air, clearance sheets are usually filled out so that when these have been processed through administration, a small royalty fee can be paid eventually to the artist/s and/or composer/s; (provided they are members of a performing rights society. This membership is explained to an artist or a composer when the initial recording at CBC takes place).

Participating in this project may encourage the artist to put forward an initiative to seek, independently of CBC, affiliation with commercial organizations who will further their musical careers. Their work compares favourably with leading interpreters of folk, traditional and country music.

The project is presently being handled by the Montreal Production Centre by the Production Manager, Sheldon O'Connell and Producer, Les McLaughlin.

In February, 1977, Inuit performers interested in marketing their own records, met with Mr. O'Connell and Mr. McLaughlin. Certain taping, record labelling and distribution difficulties were foreseen but the MPC will provide assistance and information to overcome them.

Discussions have been held in Montreal recently as well about selections from previously recorded broadcast recordings being put onto transcription by CBC for international distribution.

Highlights

A certain amount of travel has to be made by MPC programmers to keep in close touch with what is going on in government departments and other organizations. A few of these trips were:

Producer Les McLaughlin to the "Mountain Medicine" Symposium in Banff, Alberta, where he was provided with information about the northern hazards to be encountered by hunters and fishermen; and to

Whitehorse, Yukon for a production workshop with freelancers to CBC; Announcer/producer Meaki Pudlat to Yellowknife to attend the NWT Interpreter Corps Seminar;

Announcer/producer Moses Novalinga to Ottawa to cover a meeting about the Art Co-operatives of Quebec; Broadcaster/producer Elijah Menarik to Nain, Labrador for the Labrador Inuit Land Claims Proposal presentation; and to Frobisher Bay, NWT to act as a resource person to lead one of the discussions at the Community Radio Workshop.

A CBC "announcer evaluation" committee met with MPC staff to discuss performances and contracts.

The MPC continued to produce the English-language *Today Program* which included French and Cree features, Monday through Saturday, from 6:30 to 8:00 a.m.

Special arrangements were made to broadcast to the North the speech made to the Economic Club in New York by Quebec Premier Levesque.

Air-time was given to relaying information that should have gone by telephone regarding life and death situations, but the lines to some northern settlements were inadequate or inaccessible. The Inuit Tapirat of Canada later petitioned Bell Canada through the Canadian Radio-Television Telecommunications Commission for better telephone service in and to the North.

There have been recurring requests from CBC northern located programmers for specific coverage of teams representing sports associations from the Northwest Territories and the Yukon, who competed in other locations. The MPC was able to co-ordinate coverage of different sports activities, and relay the information and reports back to the northern locations.

A good idea which did not come off was the MPC proposal to create an on-air learning opportunity for northern listeners through participation in a degree credit program. This was the *Man and North* course through the Thomas More Institute broadcasts. The organization of such a learning process was found too overwhelming and there was a very limited amount of acceptance of the proposal. This was learned through feedback from listeners in the early stages of getting the program started.

Northern Messenger and Review A Monday through Friday program for audiences in isolated northern communities. The program includes messages from relatives and friends in

southern Canada, reports on territorial events, advice on ship movements in northern waters as given out by the Marine Office in Ottawa.

This program was first broadcast in 1933 as a message service when no other form of north-south communications existed. As communications facilities have improved, so the program has evolved into broadcasting more than just messages. It now concentrates on the distribution of news between and amongst northern locations.

Through English-language program producer Les McLaughlin, the MPC contributes programs throughout the year to the National Network. Programs such as "Between Ourselves". Some of the material in these Montreal-produced programs originates with the CBC northern locations. Examples from the past year were:

The World Outside, a look at young Inuit in southern schools, and *The Fur Trail*, which explored the story of fur from the time a trapper takes a pelt until auctions are held at houses across Canada. The program demonstrated the computerized nature of the business in these days, who handles fur along the way, who buys and why, what the trapper, broker, auctioneer and others receive, plus a short interview with a lady who loves her fur. Other interviews were recorded at the Hudsons Bay company auction in Montreal, at the Ontario Trappers Association in North Bay and in Ottawa. *Northern Exchange*. The northern locations, through their staff and freelancers, and from other CBC production centres across Canada, exchanged brief interviews, profiles, and information items, and used them in local productions. These are gathered by the MPC and fed to the North through satellite facilities.

CBC's northern Manitoba network has recently requested to receive *Northern Exchange* syndication regularly.

An increase in listenership came as a result of discussion and correspondence with the Public Broadcast Authority, Alaska, for distribution through its eight station chain. One station, Nome, was lost to the distribution due to limited financial resources. It didn't have to pay for the material or to broadcast it but the postage of the tape back to Canada was too costly on a regular basis.

In February, extended air-time was given to the *Northern Exchange* interviews about the difficulties with Quebec's James Bay Agreement. These and other interviews about the second fur auction ever to be

held in Point Claire, Quebec, were made into mini-documentaries.

As a result of hearing about Greenland on the *Northern Exchange*, Canadian Inuit listeners showed interest in obtaining Greenlandic music on tape or record.

With the joint purpose of gaining a closer understanding of ethnic kinship, regular exchanges have taken place over the past year with Greenland and MPC broadcasters and program material. Radio Greenland has provided special productions for the Canadian Shortwave broadcast schedule; *Isumavut* recently received its first call from Greenland (charges not reversed); and an exchange of weekly radio programs and news envelopes have developed into a reliable pattern. Radio Greenland has also sent the MPC a package of six programs in Canadian Inuktitut, and the Centre is going to try to reciprocate by working with a Greenlandic person resident in Montreal, on exchange of program leads.

Northern Showcase is the leading, northern, regional program which represents themes and issues as developed at one or another of the Northern Service locations for their own broadcast. Selection is made by Producer Les McLaughlin from this series for National Radio Network scheduling on "Between Ourselves" in order that Canadians, not living in the North, can also learn about other people and their lives as well as be entertained.

Examples of those programs which are not already mentioned in this report so far:

Alaska Highway. Am I really 35?

Karluk. A drama/documentary about the ill-fated 1913 voyage to the Arctic on the steamer "Karluk".

Alaska. The Canadian Connection.

Icebreaker Summer. The role of the Ministry of Transport icebreaker fleet.

Yellowknife A Place to Grow.

The Undersea World in the Arctic. About the wildlife in the Arctic and the mineral potential in its seas.

Will the real Alexander Mackenzie please find his River? A drama/satire on a number of modern-day legal and other obstacles the explorer would face if he tried to make the same journey today.

A Night in the Life. The cabaret scene in the Yukon.

Keewatin, Land of Mystery. What is the Keewatin and what is happening there?

Delta Development, an Update. What is happening with oil, gas and other kinds of development in the Mackenzie Delta?

By The People, For The People. Political development explored in both territories in a half-hour segment from each of the capital cities.

Greenland, Sister Of Twilight. A profile of the Canadian North's Danish neighbour.

Plans for 1977-78

Northern Showcase will be maintained as a leading English-language regional documentary program. About eight programs in the series have been selected for National Network Summer scheduling.

There is agreement with the National Network producers of "Between Ourselves" to support MPC production of Greenland specials.

No two shortwave newscasts are the same, depending upon the skills, understanding, and perceptions of the sight translator or reporter. There is a need for a research/writer who would be able to background, for Cree and Inuktitut programmers, in clear detail, brief historical geographical, social, industrial, political, and other aspects of world and home affairs under discussion on a broadcast. The MPC has no funds for this proposal but it remains in their planning for the future.

Continued promotion and development of northern musicians and composers through recording, publicity and performing rights affiliations.

Development of northern broadcast recordings has been most satisfactory and artists are coming forward from CBC northern locations and elsewhere. One of the most gifted fiddlers, Joe Loutchan, has been "discovered" through CBC Whitehorse, and plans are to record with him in 1977.

Discussions were carried on in early 1977 between the MPC and the National Network departments of Television and Radio Promotion to arrange publicity support on those media for the Northern Shortwave Service. Film and audio material is being drawn together for a summer, 1977 campaign.

At CBC Frobisher's strong request, the time of the phone-in show *Isumavut*, produced out of the MPC, was changed in November, 1976, from 12.30-1.30 to 1.30-2.00. This program schedule move was not well received by the many listeners who let the MPC know their views through the mail and on the show itself. Many Inuit work at regular jobs and their lunch hours are tied to the midday period. As they too want to listen to and participate in the program they require it to be broadcast when they are not back on their jobs. In response to this feedback, the program will be

reinstated to its former time, starting April 25th, 1977.

There has been a need for a number of years to establish an Ottawa-based position for a public affairs contract person, able to act on direct assignment from the northern location or the MPC. However, because of jurisdictional questions and uncertainty about the role of such a contract employee, little action has been taken and any candidates remain in a holiday pattern. The proposal still forms part of MPC future plans.

Program Proposals are:

In June, broadcast an open-line show across the North for the first time (it has been done by the National Network regularly across Canada but not in the North alone), using all our facilities. The two-hour program will give northerners a chance to question Indian Affairs and Northern Development Minister Warren Allmand on topics of particular interest to them and which may range from the Berger Report, to land use, to parks policy, to cost of living in the North, health and sanitation, education, land claims and the Alaska Highway Pipeline proposal. Liz Hay from CBC Yellowknife and Neil Hayes from CBC Whitehorse will host the program which will be produced in the Montreal regional radio studios.

The Inuit staff at the MPC plans to experiment with a simultaneous translation into Inuktitut on Shortwave.

Increase the hours and expand the content of Inuktitut and Cree-language programs broadcast on Shortwave.

Produce a series of programs in support of the recent recommendations of the Inuit Cultural Institute's two-year-long languages commission study, to encourage and develop the universality of writing Inuktitut in syllabics and roman print. This series could also reflect the various and different Inuit dialects that exist in Canada's North.

Another proposal might be for the Montreal Production Centre to begin a script in English teaching a basic vocabulary in Inuktitut on tape with optional script. The scripts, five-minutes each, would enable CBC northern locations to encourage non-native listeners to understand common expressions, exchange greetings and communicate with the Inuit of their community.

There is much enthusiasm for the project in Frobisher, and a suggestion from Inuvik that it be in script definitely so that local terms could be used. The prospective audience, although ostensibly non-native, and the

attempts to understand and give an appreciation of the Inuit language to others, will create an affirmative feeling in the Inuit communities.

A similar idea of teaching/learning Inuktitut (Eskimo for Beginners) was used for a series of 18 broadcast in 1970 at CBC Churchill. Announcer/Operator (then) Peter Ernker taught Manager (then) Paul Lanoy. A lesson sheet was made available to the public following each program in the series when it was rebroadcast from the Montreal Production Centre.

Appendix A

Shortwave Service

Programs broadcast by the Montreal Production Centre via the shortwave plant at Sackville, New Brunswick.

Programs Made By and For Native Peoples

Programs (language-hours per week)

Today Program (English – 9hrs) – Mondays through Saturdays, 0630 – 0800. A wake-up show of news, weather, sports and features items from the North and from the National Network. Mainly in English with French news and sports at 0700. Produced in Montreal. *Cree News (Eastern Cree – 1hr. 40 min)* – Mondays through Fridays, 0755 – 0800 (repeated on Quebec community English network at 0855 – 0900) and 1655 – 1700 (repeated on Quebec community English network at 2110 – 2115 and on Quebec community French network at 2223 – 2228). *Northern Messenger (English – 1hr. 15 min)* – Mondays through Fridays, 1213 – 1230. News and information about the North, news and feature items from northern locations and messages from southerners to friends and relatives in the North.

Isumavut (Eastern Inuktitut – 5 hrs) Mondays through Fridays, 1300 – 1400 and carried live to Frobisher via satellite and broadcast over the northern radio network. The phone-in facility makes the program a forum on which the Inuit can exchange ideas and express opinions on issues of importance. News, weather and music are also featured. *The Cree Hour – (10 hrs)* – Mondays through Fridays, 1430 – 1530 (also featured on Quebec community English network at this time), repeated 1700 – 1800 (also featured on Quebec community French network at this

time). A program of legends, interviews and music produced in Montreal.

National News (Eastern Inuktitut – 1hr 15 min) Mondays through Fridays, 1730 – 1745 (repeat at 2115 – 2130 and fed live to Frobisher via satellite and broadcast over the northern radio network. Events across Canada and around the world are reported daily.

Nalagatsain (Eastern Inuktitut – 5 hrs) – Mondays through Fridays, 2030 – 2100 (repeated next day at 1330 – 1400) and carried live to Frobisher via satellite and broadcast over the northern radio network. The program is produced in Montreal. Monday's program contains a progress report on Inuit patients who are in hospital centres away from their home communities. The Tuesday and Wednesday programs have interview items on various subjects such as native organizations, council meetings, co-ops, etc. Thursday's program has old-time stories and legends from various Eastern Arctic settlements. This Thursday program is also sent to Radio Greenland for rebroadcast over their station as part of our exchange program. Friday's program features Inuktitut recorded music from the Northern Broadcast Recordings Series as well as interviews and profiles.

Iqaluit Uqausi (Eastern Inuktitut) Frobisher Calling – (30 min.) – Mondays, 1610 – 1640. Produced in Frobisher. The program serves traditional cultural interests, and features interviews about the old way of life, the history of the Inuit, and legends, stories and folk music gathered in settlements and communities throughout the Arctic.

Neajautit Iqalummi (Eastern Inuktitut – 30 min.) – Tuesdays, 1610 – 1640. Produced in Frobisher. A music program with a hard rock sound.

Kanatap Inuit Nunangat (Eastern Inuktitut) Canada North of 60° – (30 min.) – Wednesdays, 1610 – 1640. Produced in Frobisher. A newsmagazine program which provides in-depth summaries of recent happenings. The program regularly includes co-op news, reports of settlement council meetings and newspaper editorial comments about the North.

Titirqat (Eastern Inuktitut – 30 min.) – Thursdays, 1610 – 1640. Produced at CBC Frobisher. Basically a music program with reports from Baffin Island communities.

Arnanut (Eastern Inuktitut – 30 min.) Fridays, 1610 – 1640. Produced in Frobisher. Interviews of particular interest to women.

National News Roundup (Eastern Inuktitut – 1

hr.) – Fridays, 2003 – 2030 (repeat Saturdays at 1303 – 1330). Produced in Montreal. *Our Native Land (English – 1 hr.)* – Saturdays, 1815 – 1900. The only regular National Network radio program presenting the views of Canada's native peoples.

The Cree Speaks (Eastern Cree – 1 hr.) – Saturdays, 0930 – 1000 (also featured on Quebec community English network at this time). Program includes reports on Cree patients hospitalized in Montreal and Quebec City, music and translation of newspaper items of interest to Cree listeners.

Tarqammiut (Eastern Inuktitut – 1 hr.) – Saturdays, 0800 – 0900 (repeated at 1330 – 1400). A summary of editorial comments from northern newspapers. Fed live to Frobisher via satellite and broadcast over the northern radio network. Produced in Montreal.

Radio Greenland (30 min.) – Saturdays, 1400 – 1430 and fed live to Frobisher via satellite and broadcast over the northern radio network. There is an Eastern Inuktitut version at the beginning of the program, to explain the Greenland Inuktitut dialect which follows for the remainder of the program. It is a program of legends and stories.

Television Service

Programs Made By and For Native Peoples

Tarqavut (Inuktitut — 15 min.) — Seen on Fridays at 1230 on Channel "B" (Western Arctic) and at 1630 on Channel "C" (Eastern Arctic). An information program produced for the Inuit of the Eastern and Western Arctic. Produced in Montreal, in co-operation with CBC French Services Division.

Nunatsiammiut (Inuktitut — 15 min.) — Seen on Fridays at 1245 on Channel "B" (Western Arctic) and at 1645 on Channel "C" (Eastern Arctic). A series of documentaries produced by the Nunatsiammiut Film Workshop Group in Frobisher, Northwest Territories.

Note: Tarqavut is also repeated on Fridays at 1800 on Channel "B" and 2100 on Channel "C". Nunatsiammiut is also repeated on Fridays at 1815 on Channel "B" and 2115 on Channel "C".

CBC Whitehorse, Yukon Territory

Yukon Native Voice (English — 1 hr.) — Saturdays, 1700 — 1800. This program includes current affairs, mini-documentaries, interviews, some native-language (Tlingit and Tuchone) interspersed with locally recorded music. "Native voice" receives contributions to the program through an extensive system of freelancers throughout the Yukon.

Our Native Land (English — 1 hr.) — Saturdays, 1815 — 1900. The only National Network radio program presenting the views of Canada's native peoples.

Klahowya (English — 2 hr.) — Saturdays, 1400 — 1600. A music request show aimed at youth in general and native youth in particular. The program encourages contributions from freelance community correspondents. These contributions are considered an important facet of this information and music program.

CBC Yellowknife, Northwest Territories

Community Announcements (English — 2 hr. 5 min.) — Mondays through Fridays, 1240 — 1255, 1715 — 1725. Program includes community announcements of interest to the MacKenzie Network's native listeners. Producer varies with the announcer/operator on shift. **Dene News Hour (Slavey, Dogrib and Chipewyan — 5 hr.)** — Mondays through Fri-

days, 1500 — 1600. News and information. Three native — language broadcasters daily prepare their own reports of hard news items as well as more informal community news. **Focus North (English — 2.5 hr.)** — Mondays through Fridays, 2000 — 2030. Mackenzie Network and Northwest Territories Public Affairs Show. Produced and hosted by an announcer/operator, Liz Hay.

Dene Goindi (Slavey — 2.5 hr.) — Mondays through Fridays, 2230 — 2300. Information and northern music for Slavey people. Hosted and produced by Joe LeMouel and Louis Blondin.

Native Voice News (Dogrib — 2 hr. 40 min.) — Tuesdays through Fridays, 0737 — 0740, 0837 — 0840, 1237 — 1241 and 1725 — 1729. Four-minute newscasts of original material geared to the Dogrib people and updated throughout the day. Immediately following Dogrib news are Chipewyan and Slavey newscasts produced by Joe Toby.

Gather Round (Slavey, Dogrib, Chipewyan and English — 2.5 hr.) — Saturdays, 1400 — 1630. A program of country and western requests, produced and hosted by local native people.

Square Dance Notebook (English — 30 min.) — Saturdays, 1730 — 1800. A program of lively toe-tapping sounds. Host and producer, Bob Fyfe, freelancer.

Our Native Land (English — 45 min.) — Saturdays, 1815 — 1900. The only regular National Network radio program presenting the views of Canada's native peoples.

CBC Inuvik, Northwest Territories

Community Announcements (English/Loucheux - 7 hr.) — Mondays through Saturdays, at three peak audience periods each day: 1215 — 1235, 1700 — 1715, 2220 — 2230. Community announcements and personal messages. This program is an important part of the schedule, supplying for some listeners, their only form of communication. Includes territorial news.

Morning Information (English/Inuvialookton — 21 hr.) — Monday through Sundays, 0600 — 0900. Morning information block with news, commentary, service information (time, weather, travel), current affairs. Ratio of 60% information to 40% music, Mondays through Fridays, changing to 70% music and 30% information on weekends. Input through the week from all communities on the Delta Network with special emphasis on Tuktoyuktuk, Fort Good Hope, Old Crow, Sachs Harbour and Cambridge Bay.

Noon Information (English/Loucheaux — 10 hr.) — Mondays through Fridays, 1200 — 1400. Noon information block with news, current affairs, service information. Input from all communities, with special emphasis on Fort Franklin, Norman Wells, Arctic Red River, Coppermine and Inuvik. Ratio of 60% information to 40% music.

Afternoon Information (English/Hareskin — 10 hr.) — Mondays through Fridays, 1600 — 1800, (includes Territorial News). Information block with news, current affairs, service information. Input from all communities in Delta, northwest coast and lower Mackenzie. Ratio of 60% information to 40% music with special emphasis on Aklavik, Fort MacPherson, Fort Norman, Paulatuk and Holman Island.

Night Information (English/Inuvialookton — 6 hr.) — Mondays through Sundays, except for Saturdays, 2300 — 0000. News, current affairs, service information. Contains important items of daytime information programs, especially interviews in Inuvialookton. Ratio of information to music varies with amount of repeat material available.

A Native Voice (Hareskin/Loucheux — 1 hr.) — On Tuesdays, the program is featured in Hareskin; on Fridays it is presented in Loucheux during the 2230 — 2300 time slot. An information and public affairs program produced on a contract basis by the Committee for Original Peoples Entitlement (COPE).

A Long Time Ago (Inuktitut, Hareskin and Loucheux — 1.5 hr.) — Featured Mondays, Wednesdays and Thursdays, 2230 — 2300. Stories and legends of the native peoples.

Dene Goindi (Slavey/Hareskin — 1 hr.) — Wednesdays and Fridays, 2230 — 2300. A public affairs program produced in Yellowknife and broadcast to Hareskin/Slavey communities only.

The People Speak (Inuvialookton, Loucheux, Hareskin — 4.5 hrs.) — Saturdays from 1400 — 1600 in Inuvialookton; Saturdays from 1600 — 1730 in Loucheux; and Sundays from 1300 — 1400 in Hareskin. Produced by the Committee for Original Peoples Entitlement (COPE), the program features interviews, discussions and opinions. As well, the program often features personal messages voiced by the people themselves.

Yesterday Before (English — 1 hr.) — Saturday, 1230 — 1300 and Sunday 2030 — 2100. A program featuring personal experiences that make up the history of the North.

From The Trapline (English — 0.5 hr.) — 1230 — 1300 on Sundays. An information program using current affairs approach to the fur market, the regulations governing the industry,

methods of trapping, material on hunters' and trappers' organizations. Point of view is that of the hunter and trapper.

CBC Frobisher, Northwest Territories

Kulliq (Information Morning – Eastern Inuktitut – 21 hr.) – Mondays through Sundays, 1600 – 1900. An Inuktitut-language program (with some English) of music, network news, local news, weather, sports, interviews and local feature items of interest to the local community and the eastern Arctic. Producer varies with announcer/operator on shift.

Nunavut (Eastern Inuktitut – 5 hr.) – Mondays through Fridays, 1100 – 1200. Current affairs program on issues and events in the "Nunavut" territory. Starts with a line-up of features coming up in the program; Inuktitut-language and vocabulary improvements; phone reports of events in the settlements; and one of either a narration of an Inuit legend, or an item of special interest, e.g. trapping. Also included are 60 – minute spots on consumer affairs, law, health, alcohol, government information programs. The program is laced with music and is entirely in Inuktitut.

Nalagatsain Things to Listen To (Eastern Inuktitut – 2.5 hr.) – Mondays through Fridays, 1200 – 1300. This program features interviews, reports on Inuit patients hospitalized in centres away from their home communities, and old-time stories as well as music. Produced in Montreal.

Isumavut Our Thoughts (Eastern Inuktitut – 5 hr.) – Mondays through Fridays, 1300 – 1400. A phone-in program with producer and host, Moses Novalinga. The phone-in facility makes the program a forum on which the Inuit can exchange ideas and express opinions on issues of importance. News, weather, and music are also featured. Produced in Montreal.

Igaluit Tusaavusi (Eastern Inuktitut – 10 hr.) – Mondays through Fridays, 1603 – 1800. Same format as *Kulliq*, above, intended for the "late afternoon listening" audience.

National News (Eastern Inuktitut – 1 hr. 15 min.) – Mondays through Fridays, 1730 – 1745. (repeated at 2315 – 2330). Produced in Montreal.

Territorial Eastern Arctic News (Eastern Inuktitut – 1 hr. 15 min.) – Mondays through Fridays, 1745 – 1800 (repeated at 2300 – 2315). The news is gathered from Eastern Arctic settlements, from the CBC's newsroom in Yellowknife and from news reports in Ottawa.

Nijauit Zqalummi (Eastern Inuktitut) – 0.5 hr.) – Mondays, 1404 – 1430. A music program with a hard rock sound. Producer varies.

Iqaluit Uqausi (Eastern Inuktitut) Frobisher Calling – 0.5 hr.) – Tuesdays, 1404 – 1430. The program serves traditional cultural interests, features current affairs, interviews about the old way of life, the history of the Inuit and legends, stories and folk music gathered in settlements and communities throughout the Arctic.

Kanatap Inuit Nunangat (Eastern Inuktitut Canada North of 60° – 30 min.) – Wednesdays, 1403 – 1430. A news-magazine program which provides in-depth summaries of recent happenings. The program regularly includes Co-Op news, reports of settlement council meetings and newspaper editorial comments about the North.

Arnanut (Eastern Inuktitut – 30 min.) – Thursdays, 1403 – 1430. Deals with interviews and discussions of particular interest to women listeners.

Titirkat (Eastern Inuktitut – 30 min.) – Fridays, 1403 – 1430. Light music program with reports from Baffin Island communities.

POV Drama – (30 min.) – Saturdays, 1900 – 0930. Reruns of programs featured in the early 1970's on the productions of the Povungnituk Drama Society.

National News Roundup (Eastern Inuktitut – 1 hr.) – Saturdays, 1303 – 1333 and Sundays 1603 – 1633. Produced in Montreal.

Tarqqammiut (Eastern Inuktitut – 30 min.) – Saturdays, 1333 – 1400. A summary of editorial comments from northern newspapers. Produced in Montreal.

Radio Greenland (30 min.) – Saturdays, 1400 – 1430. There is an Eastern Inuktitut version at the beginning of the program to explain the Greenland Inuktitut dialect which will follow for the remainder of the program. It is a program of legends and stories.

Our Native Land (English – 45 min.) – Saturdays, 1815 – 1900. The only regular National Network radio program presenting the views of Canada's native peoples.

Baffin Beat (Eastern Inuktitut and English – 2 hr.) – Saturdays, 2300 – 0100. The music is directed to the Inuit with local Inuit talent participating live or pre-recorded.

Sunday Afternoon (Eastern Inuktitut – 30 min.) – Sundays, 1900 – 1930. Music and community announcements comprise this program's format.

Driftin' (Eastern Inuktitut and English – 2 hr.) – Sundays, 2303 – 0100. A music show interrupted by northern news in English. Producer varies with announcer/operator on

shift. Very similar in format to the Mondays through Fridays program in the same time slot – "The Late Show" (English).

CBC Churchill, Manitoba

Chipewyan Program (Chipewyan – 2.5 hr.) – Mondays through Fridays, 1430 – 1500. This program includes messages to residents of Tadoule Lake, 140 miles west of Churchill, stories, legends, local news and music. Produced by Chipewyan freelancer, Caroline Bjorkland.

Our Native Land (English – 45 min.) – Saturdays, 1815 – 1900. The only regular National Network radio program featuring the views of Canada's native people.

Native Communications Show (Manitoba Cree and English – 30 min.) – Saturdays, 1400 – 1430. This program contains anything affecting the native and Métis peoples in Northern Manitoba. Produced by the Native Communications Inc. of Thompson, Manitoba.

*Northern Service Radio Program
Production Centres*

CBC Frobisher	1210 kHz/250W
Frobisher, NWT	
CBC Whitehorse	570 kHz/1000W
Whitehorse, YT	
CBC Churchill	1230 kHz/250W
Churchill, Man	
CBC Yellowknife	1340 kHz/1000W
Yellowknife, NWT	
CBC Inuvik	860 kHz/1000W
Inuvik, NWT	

*Northern Service Radio Low-Power
Relay Transmitter Stations
(LPRT's)*

Whitehorse is the program centre
for the Yukon LPRT**Network.

Carmacks	990 kHz/40W
Mayo	1230 kHz/40W
Elsa	560 kHz/40W
Dawson City	560 kHz/40W
Clinton Creek	990 kHz/40W
Teslin	940 kHz/40W
Swift River	970 kHz/40W
Watson Lake	990 kHz/40W
Cassiar	1340 kHz/40W
Haines Junction	860 kHz/40W
Deception Bay	940 kHz/40W
Beaver Creek	690 kHz/40W
Faro	1230 kHz/40W
Ross River	990 kHz/40W

Yellowknife is the program
centre for the Mackenzie
LPRT**Network.

Hay River	1490 kHz/40W
Fort Smith	860 kHz/40W
Fort Chipewyan, Alta	1450 kHz/40W
Fort Providence	1230 kHz/40W
Fort Simpson	690 kHz/40W
Fort Resolution	1150 kHz/40W
Wrigley	1280 kHz/40W
Rae/Edzo	1200 kHz/40W
Pine Point	880 kHz/40W

*Northern Service Television
Transmitters Fed by Satellite*

Yellowknife, NWT	8
Whitehorse, YT	6
Uranium City, Sask	8
Watson Lake, YT	8
Cassiar, BC	7
Pine Point, NWT	4
Inuvik, NWT	6
Dawson City, YT	7
Clinton Creek, YT	8
Keno, YT	13
Elsa, YT	9
Mayo, YT	7
Fort Smith, NWT	8
Faro, YT	8
Rankin Inlet, NWT	9
Frobisher, NWT	8
Norman Wells, NWT	9
Fort Simpson, NWT	9
Fort McPherson, NWT	13
Cape Dorset, NWT	9
Pangnirtung, NWT	9
Baker Lake, NWT	9
Eskimo Point, NWT	9
Pond Inlet, NWT	9
Resolute, NWT	9
Cambridge Bay, NWT	9
Coppermine, NWT	9
Hay River, NWT	9
Lake Demerais, NWT (Rebroadcast transmitter)	13
On-air date: September 9, 1976	
Fort Providence, NWT	9
On-air date: September 9, 1976	
Rae/Edzo, NWT	10
On-air date: December 20, 1976	
Tuktoyaktuk, NWT	8
On-air date: November 23, 1976	

Inuvik is the program centre
for the Delta LPRT**Network.

Norman Wells	990 kHz/40W
Fort Good Hope	920 kHz/40W
Fort Franklin	1230 kHz/40W
Fort Norman	920 kHz/40W
Fort McPherson	680 kHz/40W
Coppermine	FM 105.1 mHz/100W
Port Radium/	
Echo Bay	FM 105.1 mHz/100W
Tuktoyaktuk (600 kHz/100W)	is an affiliate.

*Northern Service Radio LPRT's
fed by Satellite from Program
Centres at Frobisher, Inuvik,
Yellowknife and Montreal.*

Rankin Inlet*	1160 kHz/40W
Cape Dorset	FM 105.1 mHz/100W
Igloolik*	FM 105.1 mHz/100W
Pangnirtung	FM 105.1 mHz/100W
Eskimo Point*	FM 105.1 mHz/100W
Pond Inlet*	FM 105.1 mHz/100W
Resolute	FM 105.1 mHz/100W
Cambridge Bay	FM 105.1 mHz/100W

Baker Lake
FM Station is an affiliate.

* Community Access.

**Unattended radio stations
broadcasting from the Network.

Canadian National Railways (CN)

Responsibilities

There is strong evidence that Canada's North holds the brightest prospects for future growth. Orderly development of its mineral, petroleum, and water resources is essential to the welfare of local communities as well as the entire country. Recognizing this commercial potential and its social responsibility, CN continues to be active in providing efficient and comprehensive transportation and telecommunication facilities for business and community interests in these regions.

CN's activities in the Canadian North concern bulk transport of mine and forest products (and potentially of liquid fuels) to southern markets, transport in logistics support of exploration and construction projects, and resupply of communities, telecommunications (telephone and microwave) for residential and commercial uses, and consulting for pipeline, rail and other studies within and outside CN. Canalog Logistics Ltd., a CN subsidiary formed in 1973, is particularly concerned with studies relating to transportation developments in the North.

Review of 1976-77

At the end of November, 1976, the Arctic Development Agency of Transport Canada commissioned Canalog Logistics Limited in conjunction with M.P.S. Associates Ltd., to conduct "A Study of the Cost of Transporting Goods Into the Mackenzie Valley". The objective of the study is to determine the cost of transporting consumer and industrial goods into the Mackenzie Valley via current and potential transportation routes. The final report is to be submitted to the federal government by April 1977.

Since 1974, CN has been participating in the protection of the sensitive Arctic environment through the National Emergency Equipment Locator System (NEELS). This is a comprehensive on-line computer system, sponsored by Environment Canada in close cooperation with the Ministry of Transport and other agencies, which provides vital information on the nearest suitable equipment and materials for combating spills of oil or hazardous material anywhere in Canada.

In the Central North, CN's rail line to the port of Churchill has been partly upgraded. In addition to the transport of grain and sulphur destined to European ports, the line also provides marine shippers with materials for resupply to the Keewatin District, NWT.

The Great Slave Railway, owned and operated by CN, running up to Hay River and Pine Point, plays an important role in the supply of

materials to northern resources development projects and to northern communities. Supplies, transferred from the railway at Hay River, are barged up the Mackenzie River to points as far north as Tuktoyaktuk.

Telecommunication services are vital to the economic development of Canada's North. The role of Canadian National Telecommunications in the Northwest continues to be the expansion of facilities and services to provide for the growing needs of business and industry, and for the social and interpersonal communications which assume greater importance with relative isolation of communities. By far the most visible aspect of its operations in the North are CNT's telephone services, including mobile radio telephones. Less prominent, but still playing a key role in the flow of information are the Public Message Service, Telex and various data communication facilities.

During 1976, the communities of Snowdrift, Holman and Pelly Crossing were provided with dial service and connected to the public telephone network. At the end of that year, CNT operated 62 exchanges serving 29 793 telephones, including 18 755 main stations. This represents a 7.8 per cent increase in subscribers from 1975. A total of 69 VHF radio-telephone base stations were operated around the clock to provide mobile radio-telephone service along all major highways and the navigable waters of the Mackenzie River system.

Telephone exchange expansion projects were undertaken at Haines Junction, Dawson City, Faro, Fort Simpson, Spence Bay, Gjoa Haven, Pine Point, Porter Creek and Yellowknife. Local cable distribution systems were expanded as warranted.

Direct Distance Dialling (DDD) service was extended to the communities of Wonowon and Norman Wells, as part of a continuing program of conversion to direct dialing of long distance calls in CNT territory.

The main telecommunications routes were improved through upgrading of the microwave systems between Inuvik — Parsons, Parsons — Taglu, Fort Providence — Yellowknife and Inuvik — Aklavik. The microwave system along the Mackenzie Valley from Hay River to Inuvik was completed with the line between Norman Wells and Sunny turned to services during 1976.

Expansion of the network included completion of a new 960 — voice channel system from Fort Simpson to Fort Nelson in July 1976. Long distance telephone service was extended via the Anik II satellite to the remote

communities of Holman, Sachs Harbour and Snowdrift. The telephone exchange formerly at Trutch was relocated to the Minaker microwave site and a 60 — channel radio system was installed to connect the exchange to the Fort Nelson toll centre. Touch-tone service was made available in Yellowknife.

A video channel was furnished under contract to CBC to provide television service to the twin communities of Rae and Edzo. Arrangements have been made to permit CBC to use a CNT microwave site to extend television coverage to Fort Providence.

Plans for 1977-78

The construction of a gas pipeline along the Mackenzie Valley represents a clear challenge to the whole transportation network in the area. However, capacity studies will be conditioned by a decision on the pipeline project expected in late 1977.

CNT will continue to develop plans and proposals for communication services to be employed in the construction phase of various gas pipeline proposals in the area and services for support of projected petroleum exploration activities in the Mackenzie Delta.

Plans for expansion and improvement of telephone services during 1977 include installation of an electronic switching system at Whitehorse and a second exchange at Yellowknife to meet the rapidly expanding telephone subscriber requirements; launching of a new "Centrex" private telephone switching system for the use of the Government of the Northwest Territories at Yellowknife; expansion of telephone exchange at Hay River, Aklavik, Carcross, Coppermine, Cassiar, Fort Smith, Porter Creek and Sachs Harbour.

The microwave network will be extended through the construction of a link from Watson Lake to Cassiar. A drop-insert microwave breakout will be installed at the Coffee Creek site to provide new routing for toll circuits to Fort St. John. A radio system will be provided between Pine Point and Fort Resolution.

In 1977, CNT will begin installing subscriber single channel radio systems along the Alaska Highway to replace sections of open wire now serving multi-party telephone subscribers. Elimination of the wire lines will provide greater service reliability.

Negotiations are continuing with Parks Canada (DIAND) to construct two microwave repeater stations in or adjacent to the Wood Buffalo National Park, to link Hay River to Fort Smith.

With financial assistance from the federal government telephone service will be ex-

tended to the remote communities of Rae Lakes, Nahanni Butte, Jean Marie and Lac LaMartre. Services by microwave radio from Watson Lake to Tungsten will be provided and the existing scatterwave radio system between Hay River and Lady Franklin Point will be upgraded. Some of this work will continue into 1978.

Canadian Transport Commission (CTC)

Air Transport Committee

Responsibilities

The licensing of air carriers to operate commercial air services, the economic regulation of air carriers, investigations and surveys relating to the operation and development of commercial air services in Canada and advising the Minister of Transport on matters relating to civil aviation.

Review of 1976-77

GAP Pine — There were no further contracts awarded or extensions for GAP Pine services.

DEW Line — Re-awarded contract to Nordair Limited for the lateral airlift extended to September, 1977 and re-awarded contract to Transair Limited for the vertical airlift extended to September, 1977.

Authorities granted to — Calm Air Int'l Ltd. — to operate a Class 4 Group C Charter service from a base at Churchill, Man.; Kenn Borek Air Ltd. — to operate a Class 4 Group D Charter from a base at Frobisher, NWT;

Survair Ltd. — to operate a Class 3 Specific Point commercial air service using Groups C and D aircraft to serve Frobisher, Broughton Island, Pangnirtung, Cape Dyer, Cape Dorset, Coral Harbour, Clyde River (Cape Christian), Igloolik, Hall Beach, Pelly Bay, Arctic Bay/Strathcona Sound, and Pond Inlet and to operate a Class 4 Group D Charter service from a base at Frobisher.

Aklavik Flying Service Ltd. — amendment of Licence No. ATC 2018/70 (C) by adding new conditions;

Northward Airlines Ltd. — authority to service the additional points of Fort McPherson, NWT; Mayo, Ross River/Faro and Whitehorse, YT under Licence No. ATC 2068/71 (NS).

Northward Airlines Ltd. — amendment of Conditions No. 4 and 5 under Licence No. ATC 2067/71 (NS).

Frontier Helicopters Ltd. — to add Class 7 Specialty-Flying Training-under Licence No. ATC 1685/66 (H);

Aklavik Flying Service Ltd. - amendment of Condition No. 8 under Licence No. ATC 473/73(CF) restricting the Licensee to Groups A, B, and C aircraft;

Nordair Ltd. — transfer of certain commercial air services to Survair Ltd.;

Northward Airlines Ltd. — authority to use Groups C and E aircraft under Licence No. ATC 2067/71(NS);

Ptarmigan Airways Ltd. — add points Fort

Resolution, Pine Point and Hay River, NWT under Licence No. ATC 1924/69(NS); Frontier Helicopters Ltd. — transfer of shares involving change of control; Whitehorse Flying School Ltd. — a) add Group B aircraft under Licence No. ATC 2388/74(C) and b) add Class 7 specialty — RF — under Licence No. ATC 2388/74(C); North West Territorial Airways Ltd. — amendment of Condition No. 6 under Licence No. ATB 369/66(CF); Kenn Borek Air Ltd. — add Group D (restricted) under Licence No. ATC 483/73(CF); Kenting Aviation Ltd. — to operate Class 4 Charter service using Group D aircraft from a base at Frobisher; Northward Airlines Ltd. — add new Condition to Licence No. ATB 1639/66(NS) (non-stop service between Norman Wells and Inuvik, NWT); Calm Air Ltd. — add the point Cullaton Lake, NWT under Licence No. ATC 1433/63(NS); North West Territorial Airways Ltd. — a) suspension of the points Hope Lake and Port Radium/Sawmill Bay and b) Removal of Condition No. 7; and Trans-North Turbo Air Ltd. — Class 3 Specific Point service using Groups A, B and C aircraft serving the points Whitehorse and Faro, YT.

Central Mortgage and Housing Corporation (CMHC)

Responsibilities

Design of housing, preparation of town development plans and drafting of planning legislation as requested by the Department of Indian Affairs and Northern Development;

financing of housing under the terms of the National Housing Act; and

the training of native personnel in the management of housing projects and the delivery of NHA programs, and the provision of technical assistance to native groups.

of the Northwest Territories for the Emergency Repair Program.

The Dene Housing Group received a grant of \$61 574 to assist them in continuing their housing program in 1976-77.

Partnership Activities — Any activity under Section 43 of the National Housing Act, in the territories will apply only to the construction of senior citizens' housing.

Total Activity Approved, 1976⁽¹⁾

	No. of Loans	No. of Loans	Hostel Beds	Amount \$000
Yukon	200	314	—	10,678
NWT	131	468	40	18,819

⁽¹⁾ New and existing housing

Review of 1976-77

Yukon

In 1976, a total of 242 new housing units were financed under the National Housing Act, 171 by approved lenders and 71 by CMHC. Of the units approved by CMHC, 22 were under the Assisted Home-Ownership Program, 25 through other direct lending programs, and 24 in a small public housing project.

Loans for 72 existing housing units were made in 1976, 69 of which were financed by the approved lenders and three by CMHC.

Twenty-four new housing units were financed under Section 43 of the National Housing Act in 1976. Financing for approximately 30 additional units has been provided in the CMHC 1977 Capital Budget.

A sustaining grant of \$44 900 was provided to the Yu-Native Non-Profit Housing Association, to support their housing program for a six-month period.

Northwest Territories

Loans for 434 new housing units were approved in 1976, of which 58 units were financed by the approved lenders and 376 units by CMHC. The greater part of the CMHC activity arose from public housing projects, which accounted for 297 units. The balance was largely made up of 30 units in low-rental projects, 23 under the Assisted Home-Ownership Program and 26 through CMHC's residual lending program.

Thirty-four existing housing units were financed in the past year, 23 by approved lenders and 11 by CMHC.

Under Section 43 of the NHA, 297 family units were financed in 1976. Provision has been made in the 1977 Capital Budget for financing approximately 240 additional units.

Grants, totalling \$199 327 were awarded to the Métis and Non-Status Indian Associations

Crown Assets Disposal Corporation (CADC)

Responsibilities

Crown Assets Disposal Corporation is responsible for the sale of surplus assets reported by government departments and agencies operating in the North; and under a long-standing agreement conducts the sale of United States Government surplus property located at DEW Line sites and other northern establishments. The corporation also has an agreement to act as agent of the Government of the Northwest Territories in the sale of their surplus assets.

Review of 1976-77

Normal sales were conducted during the summer and autumn at locations in the Yukon and Northwest Territories. Two United States communication sites were closed down this year, one at Resolution Island, the other at Brevoort Island and the complete sites were sold to the Northwest Territories Government. Incidental items of US surplus property located at DEW Line stations were sold to individuals or organizations operating in the area.

Plans for 1977-78

The corporation is anticipating stepped up activities in the sale of U.S. material across the DEW Line, in the coming fiscal year, and will continue to assist in any special disposal problems that may arise at Canadian or U.S. establishments.

Department of Communications (DOC)

Responsibilities

The mandate of the Department of Communications is to foster the orderly development and operation of telecommunications for Canada in the domestic and international spheres. This includes: recommending national policies and programs with respect to communications services for Canada; promoting the development and efficiency of Canadian communications facilities; assisting Canadian communications systems to adjust to changing conditions; allocating radio frequencies to permit the orderly use of radio communications; protecting Canadian interests in international telecommunications matters; and co-ordinating telecommunications services for departments and agencies of the Government of Canada.

Review of 1976-77

Northern Co-ordination

The department continued its participation in several of the committees of the Advisory Committee on Northern Development (ACND), and played a leading role in co-ordinating northern communications planning. The Northern Communications Assistance Program, discussed in detail below in the Financial Contributions section, was among a number of communications initiatives reviewed by the ACND.

The department was active in the ACND interdepartmental communications committees in Whitehorse (under the Federal Inter-departmental Co-ordinating Committee) and Yellowknife (under the NWT Co-ordinating Committee). The Yellowknife committee, which formerly dealt with both transportation and communications, was split into two and the Standing Group on Communications is now chaired by the Regional Director, Central Region, of the Department of Communications.

The Yukon Territorial Communications Project, set up to bring about an integrated VHF mobile coverage and trunking system for federal and territorial public safety agencies in the Yukon was largely completed during 1976-77. During the year, the Yukon Lands and Forest Service of DIAND and several departments of the Yukon Territorial Government were integrated into the system, which already included the RCMP and the Yukon Department of Highways.

Native communications is another of the department's main concerns north of 60°. In the Yukon, DOC chairs the Co-ordinating Committee of the Native Communications

Program of the Department of the Secretary of State, for the Ye Sa To Communications Society, and advises the society on various aspects of electronic communications. The department plays a similar role in the NWT, through its membership in the co-ordinating Committee for the Native Communications Society of the Western NWT. Representatives of the latter society, based in the Mackenzie Delta region, made proposals during the year to set up their own regional communications society to serve the mixed native population of the area.

Management of the Radio Frequency Spectrum

The department is responsible for assigning radio frequencies and issuing radio licences under the Radio Act. In the North, this service is provided at three district offices in Yellowknife, Ft. Smith and Whitehorse. The office at Ft. Smith also operates a monitoring station.

Financial Contributions

Accord was reached during the year between the department and Bell Canada to designate Chesterfield Inlet as the 10th NWT community to receive Anik thin route telephone service under a minimum annual revenue guarantee agreement (MARG). Service was established in the community in December 1976. A previous MARG Agreement, under which the federal government guarantees Bell a minimum annual revenue, made possible the introduction of satellite telephone service to Bell's territory in the NWT. Increasing use of telecommunication services by federal agencies in the 10 MARG communities has meant that the amount that must be made up each year to Bell by DOC is rapidly falling.

DOC's contributions to CNT for the operation of the Mackenzie Valley Poleline ceased in 1976-77 with a final payment of \$40 000. The poleline was rendered obsolete by the final extension of high-quality microwave service to Inuvik from Hay River.

In January 1977, the Minister of Communications announced a major new funding program, the Northern Communication Assistance Plan, to assist Bell Canada and Canadian National Telecommunications to extend reliable long-distance telephone service to every community in the NWT. Under this program, an outgrowth of the federal government's 1971 policy on northern development, the federal government will contribute \$9 million over a five year period to cover the capital costs of installing inter-community telephone service throughout the NWT with a

technical quality comparable to that available in Southern Canada. Bell and CNT will invest a similar amount in capital and operating funds for local exchange equipment and for operating the telephone circuits between communities over the same period of time. The long distance links to be funded through NCAP will be provided through satellite ground stations or terrestrial means such as VHF radio, whichever is the more economical means of serving a particular community. NCAP will not affect the Yukon because all Yukon communities already have basic telephone facilities.

Research

The department's Communications Research Centre (CRC) continued work during the year on three research projects that have direct application to the North, as well as to other remote areas of the country. The Integrated Northern Communications Project has as its objective the development of an upgraded automatic HF radio telephone system that could be fully integrated with the country's switched network and with trail radios. It is hoped that the quality of the system will approximate that of satellite service while costing considerably less. During 1976-77, the following steps were taken: the syncompex voice processing system, designed to improve the quality of HF transmission, was completed; a contract was let to Sinclair Radio to look at the feasibility of a specially designed HF antenna to withstand the harsh northern environment; and a contract was let to Nautel of Nova Scotia to develop a 100 watt ultra reliable transceiver. Also during the year, visits were made to the provincial capitals and considerable interest was shown by both provincial carriers and governments in the application of the system to remote and isolated regions in the provinces. Some provinces expressed an interest in holding field trials once the finished system had been tested in the laboratory.

The Inuit Trail and Remote Camp Radio Project, the second CRC northern related project, is aimed at developing a reliable radio system that will allow Inuit trapping, fishing, and hunting parties to maintain continual contact with their home communities. A prototype of the system, which operates in both VHF and HF frequencies was tested during the year in the northern Quebec community of Koartak.

The third CRC project with application to the North is called the Northern Satellite Earth Terminal Experiment. It is designed to

determine how far north the Anik satellites can see before the curvature of the earth's horizon prevents signals from getting through. Testing was carried out during the year with transportable earth terminals in the area of Eureka.

The department's Social Policy and Programs Branch, in co-operation with the Department of National Health and Welfare, began a study during the year on tele-medicine in the Baffin Island region of the NWT. The major purpose of the study is to identify the present use (and associated problems) of telecommunications in health care delivery in the area, as well as to establish the communications needs and requirements for the effective delivery of health care in an area made up largely of small isolated communities. After consultations with senior health personnel in the Baffin Island region, data was collected from the various nursing stations using logs for quantitative information and interview questionnaires for more subjective information.

DOC's Central Regional Office, headquartered in Winnipeg, and responsible for most of the NWT, has been involved in another research project related to trail radios, the Remote Power Supply Project. In response to the relatively high cost of gasoline generators and replaceable batteries in the North, and the need for a light, portable source of electrical energy to power trail radios, the Regional Office undertook to evaluate various power sources to find the one that would perform best under difficult northern conditions. Solar generation was chosen as the most practical method, and a number of solar panels were tested at appropriate northern latitudes, where sunlight is scarce in the winter months. Testing in Snare Lake, a hunting and trapping community in the western NWT revealed that prior technical experience with electronics is necessary to operate the panels satisfactorily.

Satellite Services

As mentioned above, Bell and Telesat Canada installed a thin route satellite ground station in Chesterfield Inlet, thus bringing Anik satellite telephone service to that Keewatin community. During the year, Bell also installed additional voice circuits in existing earth stations at the following sites: Coral Harbour (1), Eskimo Point (1), Frobisher (12), Rankin Inlet (2), Resolute Bay (4), Sanikiluaq (1), and Nanisivik (2).

CNT made its first entry into satellite communications during the year when it installed thin route earth stations in the western NWT

communities of Sachs Harbour, Holman Island and Snowdrift, previously served only by HF radio-telephone. CNT sub-leases 10 per cent of Bell Canada's northern service second Anik channel to serve these three communities.

A financial agreement worked out between the Yukon Government and Telesat Canada made possible the introduction of CBC television to four small Yukon communities via Anik satellite. The four communities, Beaver Creek, Haines Junction, Carmacks, and Pelly Crossing joined a fifth, Teslin, which had paved the way earlier in bringing live television to the North via low-cost TV-receive only earth stations. All these small communities, and three others receiving TV via terrestrial facilities are paying \$1000 a year themselves towards the cost of this service (plus an initial capital cost of \$750) with the rest being paid by the territorial government.

Terrestrial Services

During the year, Bell Canada installed local exchange facilities in Hall Beach, Lake Harbour, Clyde River, and Port Burwell. All communities in Bell's NWT territory now have local exchange facilities. The Bell HF radio base-station in Frobisher was improved and modernized.

CNT made a number of improvements during the year to upgrade service in its territory, which includes the Yukon and that part of the NWT west of 102° longitude. In the Yukon, CNT made the following improvements to its telecommunication routes and systems:

breakouts along the Grande Prairie Alaska microwave system provided expanded and better long-distance circuitry at Destruction Bay, Haines Junction and Beaver Creek; the community of Pelly Crossing received local dial and long distance service; the local telephone exchanges at Haines Junction and Dawson City were expanded. And in the western NWT the following improvements were made by CNT:

the Inuvik-Parsons microwave system was upgraded from 120 to 300 channels and the Parsons Taglu system from 60 to 120 channels; the Hay River-Ft. Simpson-Norman Wells microwave system was extended to Inuvik; the Ft. Providence to Yellowknife system was expanded from 120 to 600 channels; the Hay River to Ft. Simpson microwave system was upgraded from 300 to 960 channels; the new 960 channel microwave system

between Ft. Simpson and Ft. Nelson, B.C., became operational; the local telephone exchanges at Pine Point, Ft. Simpson and Spence Bay were expanded; and local telephone exchanges were installed at Holman Island and Snowdrift at the same time that Anik long distance service was introduced.

Plans for 1977-78

Northern Co-ordination

The Yukon Territorial Communications Project, now essentially complete according to the original concept, will be expanded as the participating agencies move into new areas. The Dempster Highway, still under construction between Dawson and Inuvik, is one area where expansion will occur as the highway nears completion.

The department's Central Regional Office is planning to carry out a communications fieldworker project in the summer of 1977 with funding from the Department of Manpower's Summer Job Corps Program. The project will involve hiring about 50 students to look into the communications needs of some 35 Arctic communities, and also to bring information to these communities about communications developments elsewhere in the North and South. The project is being done in co-operation with the Inuit Tapirat of Canada (ITC) and the Committee for Original Peoples' Entitlement (COPE), two of the native organizations active in the North. In addition to providing these groups and DOC with valuable information on communications needs at the community level, the project may well lead to the formation of new native communications societies in four Arctic regions: the Mackenzie Delta, the Keewatin, the Arctic Islands and Baffin Island. Such societies are eligible for funding from the Secretary of State Department's Native Communications Program. The project will be evaluated at the end of the summer and if successful, it may be continued in the next fiscal year.

Management of the Radio Frequency Spectrum

As an aid to small and remote communities, which applies to most of those in the North, DOC is developing a new simplified application form for a Technical Construction and Operating Certificate for low-power FM and television transmitters. These forms will be based on the new technical requirements for



Northern Community Television Broadcasting

these transmitters and will speed up the processing of applications in the low power transmitter category. Both forms are now in the gazetting process and should be available sometime next year.

Financial Contributions

The Minimum Annual Revenue Agreement (MARG) between Bell Canada and the federal government will terminate on January 10, 1978. The MARG Agreement has played an important part in bringing satellite communications to small communities in the North,

where the meager revenues could not by themselves have justified such services. In the meantime, Bell's revenues have increased in the communities covered by the Agreement to the extent that once it lapses very little fall-off is expected.

The financial details of the Northern Communications Assistance Program (NCAP) will be negotiated between DOC and the northern carriers, Bell Canada, and CNT. The Government of the Northwest Territories and interested native organizations will be consulted on scheduling priorities before the program is

implemented. NCAP is one of the most significant financial initiatives ever taken by the federal government in improving northern communications and it is hoped that the facilities to be financed will begin to be installed later in the fiscal year.

Research

The Integrated Northern Communications Project will continue during 1977-78 with further work being done by Nautel on the ultra reliable transceiver and by Sinclair Radio on the weather-resistant antenna. Bell-Northern,

which had been involved in the project earlier, has dropped out, and its role in the project will be taken over by a small telecommunications equipment manufacturer.

During the summer of 1977, the prototype system of the Inuit Trail and Remote Camp Radio Project will continue to be tested by Inuit hunters and fishermen at Koartak in northern Quebec. For this testing period the VHF repeater will be moved from its location near the community to a high hill located in the middle of the area frequented by hunting and fishing parties. This will greatly extend the range of the VHF portables, leaving the less reliable HF portables to be used only for more distant communications. A number of Canadian electronic equipment manufacturers have developed special component parts for this radio system.

The Northern Satellite Earth Terminal Experiment will terminate in 1977-78. When completed, the results are expected to be particularly useful for the military, and for weather forecasting in the far North.

A report on the Baffin Island Region Telemedicine Study will be completed in 1976-77. Results will be used by the Department of National Health and Welfare to evaluate their telecommunications needs in the area, and to propose any improvements.

During 1977-78, the remote Power Supply Project's solar panels will be tested near Ft. Franklin, NWT by technologists and freshwater fish specialists who have experience in operating electronic gear. A final report on this project is not expected until 1978-79.

Satellite Service

In 1977-78, Bell Canada plans to add additional satellite circuits at the following thin route stations in the NWT: Baker Lake (2), Cape Dorset (1), Pond Inlet (1), Coral Harbour (1), Igloolik (1), and Pangnirtung (2). As mentioned above in the Financial Contributions section, the financial details of the NCAP program are being negotiated and it is hoped that a start can be made during the year on installing satellite earth stations in the remaining eight communities in Bell's NWT territory still dependent on HF radio-telephones.

Terrestrial Services

CNT plans the following improvements to its routes and systems in the western NWT:

to meet the rapidly expanding telephone subscriber service in Yellowknife, a second 2000 line electronic stored program exchange unit, similar to those at Hay River and Inuvik will be installed;

negotiations are continuing with Parks Canada to construct two microwave repeater stations in or adjacent to Wood Buffalo National Park; These sites are required for the construction of a 120 channel capacity microwave link from Hay River to Fort Smith. Completion of this extension will replace the last of CNT's major pole lines.

a new "CENTREX" private telephone switching system is scheduled to be operational in the service of the Government of the Northwest Territories at Yellowknife. This Canadian-manufactured equipment (NTL SL-1) incorporates the latest in the recently advanced technology of processor-controlled digital switching; The Hay River (C1-EAX) stored program exchange will be expanded from 1200 to 2000 line capacity and the older step-by-step exchange on the island will be phased out. The toll switching equipment will remain at its present site in the old town. telephone exchange expansion is scheduled for Aklavik, Carcross, Coppermine, Fort Smith, and Sachs Harbour. Telephone cable plant will be added to as required. A 60-voice channel radio system will be provided between Pine Point and Fort Resolution.

CNT will continue to develop plans and proposals for communications services needed in the construction phase of various proposed gas pipeline proposals, and for support of projected petroleum exploration activities in the Mackenzie Delta.

The following improvements will be made in the Yukon during 1977-78:

CNT will begin a program of installing subscriber single channel radio systems along the Alaska Highway to replace sections of open wire now serving multi-party telephone subscribers. Elimination of the wire lines provides greater service reliability and significantly lower maintenance costs. Installation of a computer-controlled SP-1 local and long distance exchange at Whitehorse will begin. Completion is expected later in 1978. The cord-and-plug toll boards will be replaced by semi-automatic operator positions employing cathode ray tube (CRT) screens, with all commands of the operator being transmitted from a keyboard for execution by the electronic switching system.

Department of Energy, Mines and Resources (EMR)

Geological Survey of Canada (GSC)

Responsibilities

The fundamental role of the Geological Survey of Canada is to provide a comprehensive inventory and understanding of the geological framework of the country interpreted in terms of all national activities that make use of or are affected by geology. The activities include not only determining the mineral and energy resource potential available to Canada but also carrying out land capability studies, studies on the geology of urban areas and studies designed to assist in conserving our natural environment.

The Geological Survey contributes to three programs of the Department of Energy, Mines and Resources — the Earth Sciences Service Program, the Minerals Program and the Energy Program.

The first program is concerned with obtaining information about the geological framework of Canada, its properties, evolution and development. Information on bedrock geology is obtained through systematic surveys, regional studies and national compilations and is used for identifying resources and for making appraisals of non-renewable resources. Similar studies are carried out to obtain information about the nature and evolution of the Canadian landscape, its surficial materials, terrain properties, processes, hazards and capability for use. Such information is essential when evaluating the effects of energy and mineral resource development.

Minerals and Energy Programs are concerned with resource identification and resources estimation. Attention is given to identifying areas likely to contain mineral and fossil fuel resources. Estimates of the amount and quality of energy resources are made each year but those for mineral commodities, because of the complex calculations involved, are made less frequently.

Review of 1976-77

During the report period the principal missions of the Geological Survey continued to be: evaluation of mineral and energy resources; provision of geoscientific information and technology used in the discovery of needed resources; and determination of the limits of the landmass to withstand various types of use. To meet these needs the principal and most basic task is the study, mapping, description and interpretation of the geology of Canada and its adjacent offshore

areas. For some years the Geological Survey has placed particular emphasis on the area north of 60°. Systematic bedrock mapping continued of the Phanerozoic strata (primarily to assist in the search for oil and natural gas) and of the Canadian Shield (the source of a wide variety of metallic minerals). Many of the latter studies consist of upgrading the geological mapping of areas in which Precambrian supracrustal rocks have been preserved. To meet the need for geoscientific data concerning the Canadian landmass several objectives must be met. There must be systematic coverage of the surficial geology of Canada; terrain hazards must be identified; and the geological factors involved in terrain rehabilitation must be evaluated and the needed data made available. Such information becomes increasingly important as the North is opened to development.

Preliminary results of the work carried out during the 1976 field season were released in two volumes of the Geological Survey's Report of Activities series, i.e. in November 1976 (Paper 76-1C) and in January 1977 (Paper 77-1A). The former contained 57 reports, 15 of which were directly concerned with areas north of 60°; the latter contained 99 reports of which 31 were concerned with northern areas.

Mapping of the Archean metasedimentary and metavolcanic rocks and Aphelian and Archean granitoid rocks of the Tulemalu (65 J) and Thirty Mile Lake (65P) and MacQuoid Lake (55 M) map-areas was completed for publication at a scale of 1:250 000. In the latter two areas detailed mapping was also carried out. Detailed mapping of map-sheet 56 D/1 (northeast of Baker Lake) was started. On the basis of available information the area is thought to be one where the complex history of a part of the Churchill Structural Province may be unravelled. Some of the anorthosite complexes in the area contain oxide-rich layers that are high in Ti and V. Copper sulphides are sparsely associated with some gabbroic rocks. Mapping for publication at 1:250 000 of the northern half of Amer Lake (66 H) was completed. Quartz-magnetite iron-formation is associated with basic volcanic rocks and magnetite iron — formation with biotite schist and amphibolite. Work continued in the Hackett River-Back River Greenstone belt in order to provide a base for prospecting and to correlate geophysical and geochemical patterns and anomalies to the available geological and mineral deposit data. The first season of the 1:50 000 mapping program of Keskarrah Bay map-area (86 H) was com-

pleted. Detailed studies were made in the area of the East Arm of Great Slave Lake. Studies of the Foxe Fold Belt carried out in 1974 were extended east to Foxe Basin through mapping done in Barrow River map-area. Mapping of the southwestern margin of the Back River Volcanic Complex was continued. All of the foregoing studies are designed to contribute to the fundamental geological information needed for mineral exploration.

Stratigraphic, structural and paleontological studies are essential to an understanding of the geological framework of the sedimentary basins of Arctic Canada. Such knowledge is especially important in ascertaining our coal, oil and natural gas resources. Studies were carried out of the Paleozoic rocks of Somerset Island and southwestern Boothia Peninsula with the aim of evaluating the potential of the area and of assisting in site selection for a possible gas pipeline route. A detailed study of faulting in Virginia Falls map-area (95 F) District of Mackenzie was carried out. Significant lead-zinc mineralization is associated with faults in this area and they are thus obvious targets for future exploration. Detailed work was also carried out in Mount Eduni and Bonnet Plume Lake map-areas (106 A.B). These areas contain the Redstone River Formation which elsewhere in the District of Mackenzie has proven to be an important copper-bearing unit.

A considerable part of the Geological Survey's effort is now devoted to studies of surficial geology and geomorphic processes and geotechnical aspects of bedrock and surficial geology that may affect the engineering use of the land. Studies of the soils and vegetation types of north-central District of Keewatin were carried out in conjunction with terrain mapping in the same area. Two parties working in the southern District of Keewatin continued studies concerning the use of surficial materials in prospecting. Permafrost is a way-of-life in the North and its effects may seriously disrupt construction. Several projects were carried out in 1976 as part of the Geological Survey's continuing contribution to permafrost studies. River crossings will become increasingly important in the North as the road network expands and as projected pipeline routes are developed. The Geological Survey is carrying out several studies designed to investigate the hydraulic characteristics and hydraulic regimes of major rivers and their tributaries. Particular attention is being given to channel stability, changes in sediment storage, sediment transport and the influence of permafrost and river ice. One

such study is being made of Big River, southwest Banks Island, another of the Babbage River where it crosses the Yukon Coastal Plain and another of three rivers that flow from the east into the Mackenzie River between 64° 10' and 64° 25' North.

The Geological Survey continued its major Uranium Reconnaissance Program involving both geophysical and geochemical studies. Geochemical orientation and reconnaissance surveys were made over a wide variety of physiographic and geological regions in central Yukon. An evaluation was also made in the Yukon of the usefulness of water samples for uranium reconnaissance surveys. As a follow-up of anomalous geochemical results obtained from a reconnaissance lake sediment survey undertaken in 1975 in Nonacho Lake area, District of Mackenzie, detailed investigations were undertaken in 1976. Airborne gamma-ray spectrometer surveys were flown at 5 km spacing over map-sheet 65 in southern Keewatin as part of the Uranium Program. The area includes Dubawnt and Ennadai lakes. Adjacent parts of northern Manitoba and Saskatchewan were also covered. Results of this work area being made available through the Geological Survey's Open File releases.

Marine geoscience studies were carried out in the eastern Arctic between July and October, 1976 from *CSS Hudson*. These were designed to study the margins of Baffin Bay using geophysical techniques; to extend earlier studies of the crust beneath central Baffin Bay; and to obtain bedrock geology data from the northeastern Baffin Island shelf. Bedrock cores were obtained from the shelf area, a thick sedimentary basin in Home Bay was surveyed and variations in the degree of iceberg scour on the sea bottom were observed.

Plans for 1977-78

Of the 436 projects being carried out by the Geological Survey of Canada in 1977-78, 165 will involve work on areas north of 60°, and 67 of these will have a field component in 1977-78.

Precambrian bedrock studies upgrading reconnaissance mapping to modern 1:250 000 standards continues. This work provides the basis for the syntheses and interpretations of the geology, and for the assessment of the mineral potential of these areas. Field work on the Precambrian rocks of southeastern Ellesmere and Devon Islands (38B, 39B, C,E-H; 48E,F; 49A-C) will continue, and will commence for a new project, Operation Borden, a study of the Upper Proterozoic rocks of north-

ern Baffin and Bylot Islands (37G; 38B-C; 48A-D). Two more new projects will have field work start for studies of the geology of the Coronation Gulf area (76M-O; 77A) and the rocks of the Coronation Geosyncline (86J,O). Field work on the geology of the Foxe Field Belt of Central Baffin Island (27B,C; 37A,D) will be resumed this year, and will continue on the geology of the Penrhyn Fold Belt of the Melville Peninsula (460,P; 47A) the Archean felsic volcanic complex near Regan Lake (76B,C,F,G) the anorthositic and gabbroic rocks southeast of Baker Lake (56D) and the Proterozoic rocks of the Raptan Group of the Mackenzie, Wernecke and Ogilvie Mountains (95L,M; 106A). Field work on the Proterozoic rocks of the eastern Cordillera will continue in the area of the Mackenzie Arc and Brock Inlier (96D; 97A; 106A-C, F,G).

In other projects in the Cordillera, field work will continue in studies of the structure of the Mackenzie Mountains (106AB) of the geology of the Mount St. Elias area (115B,C,G,F) of basins of the western Cordillera (104H, 115A) and of Cambrian biostratigraphy of the area (105P). Work on identification of favorable environments for mineral occurrence continues, and field work will take place on the metallogeny of the Selwyn Basin (105N,O) and for a study of the regional metallogeny of the Canadian Cordillera.

Field work will start for new projects to study the coal deposits of the Bonnet Plume Basin (106E) the Lower Paleozoic rocks of the Mackenzie Mountains (106A,B,F,G) and the geology of the northern intermontane belt of the Labarge, Carmacks, Glynnion and Teslin map areas (105A,C,L,I). Two projects on the biostratigraphy of Paleozoic rocks in the Day River and adjacent areas (85B,C) will involve field work in this fiscal year.

In the Arctic Islands field work will continue in 1:250 000 scale mapping of western Devon Island (49D) and northern Ellesmere Island (49H; 56D,E; 120C,G; 240A,H). Field work will also be undertaken in stratigraphic and structural studies in the western Queen Elizabeth Islands: Mackenzie King, Brock, Borden and Southern Bylot (38B,69,79,89,99) and will commence in a new project on the stratigraphy and sedimentology of the Tertiary sediments of the eastern Arctic with work on Ellesmere Island (49,120). All results of work in the islands help in resource evaluation, a decisive factor in possible future construction of pipelines.

Airborne gamma-ray spectrometer surveys will be flown at 5 km spacing over large ar-

eas of the District of Keewatin and the southeastern part of the District of Keewatin and the southeastern part of the District of Mackenzie (46,47,55,56,57,66 and 75) totalling 22 1:250 000 map sheets. Reconnaissance geochemical surveys under the Uranium Reconnaissance Program will be carried out by contract in northeast Keewatin (46N-P; 47A,B) and in a new project in the Yukon (106C-F; 116A-H). Follow-up surveys will take place in northeast District of Mackenzie (75F,K; 76H,I) and in field work in a new project of drift prospecting investigations in Bear-Slave province will start (76,86).

Contract aeromagnetic surveys will be flown in the Coppermine area (76L,M; 86I-K, M-P). Further work on electrical mapping techniques will be carried on at a number of localities in the District of Mackenzie (95E,H; 107C) and offshore in Mackenzie Bay (107). Studies of the seismic properties of permafrost will continue (107; 117 offshore) as well as those of techniques of mapping permafrost offshore (107,117). Bottom studies of the Beaufort Sea in the same area will continue, these including the surficial geology of Mackenzie Bay and the continental shelf. In other work offshore field work will be carried out on the Quaternary geology of the Lancaster Sound area. Multidisciplinary, as well as bedrock and surficial geology surveys, will take place in the Davis Strait area. Field work on the geological zonation of central Arctic coasts will continue (48C-F; 58C-F).

Offshore surveys of surficial geology are one of a variety of terrain surveys carried out by the Geological Survey of Canada, reflecting a continuing concern of the natural environment, with particular emphasis at present on the routes of proposed pipelines. The program of standard, systematic, surficial mapping forms the basis for subsequent assessments of terrain sensitivity to the pressures of the development and transportation of resources.

Systematic surficial mapping in Keewatin (and in northern Manitoba) will complete the inventory of terrain along the proposed gas pipeline route. Field work north of 60° will be in southeastern and central Keewatin (55D; 56D; 65A,P, 66A) and north-central Keewatin (56E,F,K-N; 66H,I). Follow-up work in completion of terrain inventory studies will be undertaken on Bathurst and Cornwallis Islands (58F,G; 68E,G,H; 69A,D; 79A) and on Somerset and Prince of Wales Islands (58B,C,D).

Mapping on Amund Ringnes and Cornwallis islands (69D,F; 79E,H) will complete the terrain inventory of Ringnes and adjacent is-

lands. By the end of the fiscal year 1:250 000 scale mapping will be complete along the entire gas pipeline route on the western side of Hudson Bay.

A study of rock heave will commence in the Districts of Keewatin and Franklin (56,57, 58,68) and studies of slope movements and periglacial processes in central Keewatin (650,P) and the Parry Islands (58F,68H,79B). All such processes are of importance in pipeline construction. The relationship of vegetation to surficial materials is a further component of the mapping program relating to pipelines. Field work this year will be carried out in the Ringnes Islands (69F). Field work will continue in the study of selected rivers along the Mackenzie Highway (950,96C) and a study of permafrost growth will involve field work in the Mackenzie Valley and along the Arctic coast (107C).

Coincidence of a potential gas pipeline route with mineralized regions in central Keewatin increases the value of combined terrain inventory mapping in a new project, and drift prospecting studies (76,86). Field work will also be carried out in a new project to study the sediment budget of Arctic Lakes (55E,L; 65I). This will add to knowledge of the relationships between mineralized bedrock, glacial drift, and lake sediments. Field work will start on Bylot Island (38B,C; 48D) in a new study of glacier sedimentation.

Field work will start on a new project of surficial geology and terrain inventory in the southern Yukon (95,105,115). This complements a multidisciplinary study of Quaternary geology taking place further north in the Old Crow Basin (116N,O; 117A,B). The final field work to complete the inventory of the surficial geology of Banks Island will be carried out (88B,C; 97H) in conjunction with field work on a study of fluvial and mass wasting processes.

Reports relating to the Northwest Territories and Yukon Territory published by the Geological Survey of Canada in 1976-77.

Bulletins

- 258 Proterozoic and Paleozoic geology of Banks Island, Arctic Canada; Andrew B. Miall.
- 259 Upper Jurassic-Lower Cretaceous assemblages from Arctic Canada; W.W. Brideaux, M.J. Fisher.
- 260 Stratigraphy of central and eastern Ellesmere Island, Arctic Canada. Part III. Upper Ordovician (Richmondian) Silurian and Devonian; J.Wm. Kerr.
- 274 Middle Devonian cystiphyllid corals from

the Hume Formation, northwestern Canada; R.A. McLean.

Papers

- 74-25 Geology of the Pond Inlet map-area, Baffin Island, District of Franklin; G.D. Jackson, A. Davidson, W.C. Morgan.
- 74-64 Geology of Watterson Lake map-area, District of Keewatin; K.E. Eade, F.W. Chandler.
- 75-10 Biostratigraphic determinations from the subsurface of the Districts of Franklin and Mackenzie and the Yukon Territory; W.W. Brideaux, D.R. Clowser, M.J. Copeland, J.A. Jeletzky, B.S. Norford, A.W. Norris, A.E.H. Pedder, A.R. Sweet, R. Thorsteinsson, T.T. Uyeno, J. Wall.
- 75-14 The hydrogeochemistry of the Keno Hill area, Yukon Territory; C.F. Gleeson, R.W. Boyle.
- 75-28 Permafrost in the Mackenzie Delta, Northwest Territories; Michael W. Smith.
- 76-1B Report of Activities, Pt. B; contains 65 short reports, 26 of which are concerned with the North.
- 76-1C Report of Activities, Pt. C; contains 57 short reports, 15 of which are concerned with the North.
- 76-8 Geology of the Bonnet Plume Basin, Yukon Territory; D.K. Norris and W.S. Hopkins, Jr.
- 77-1A Report of Activities, Pt. A; contains 99 short reports, 31 of which are concerned with the North.
- Open Files
- 324 Regional lake sediment geochemical reconnaissance data, Nonacho Belt, east of Great Slave Lake NWT; E.H.W. Hornbrook, R.G. Garrett, J.J. Lynch.
- 325 Regional lake sediment geochemical reconnaissance data, Nonacho Belt, east of Great Slave Lake; NWT; E.H.W. Hornbrook, R.G. Garrett, J.J. Lynch. NWT
- 326 Regional lake sediment geochemical reconnaissance data, Nonacho Belt, east of Great Slave Lake; NWT; E.H.W. Hornbrook, R.G. Garrett, J.J. Lynch.
- 327 Regional lake sediment geochemical reconnaissance data, Great Bear Lake, NWT; E.H.W. Hornbrook, R.G. Garrett, J.J. Lynch.
- 328 Regional lake sediment geochemical reconnaissance data, Great Bear Lake, NWT; E.H.W. Hornbrook, R.G. Garrett, J.J. Lynch.
- 336 Unedited geological map with generalized correlation chart illustrating the salient features of the distribution, lithology, and age of Cretaceous and Tertiary rocks of the northwestern District of Mackenzie; C.J. Yorath.
- 338 Geological map and legend of Itchen Lake map-area, District of Mackenzie, NWT; H.H. Bostock.
- 343 Marine geophysical data collected in Baffin Bay area.
- 346 Ten stratigraphic sections from the lower Cambrian Sekwi Formation, Mackenzie Mountains, Northwestern Canada; W.H. Fritz.
- 350 Mackenzie Valley geotechnical data bank (magnetic tape); D.A. Proudfoot, D.E. Lawrence.
- 353 Geological maps and legends, Yellowknife and Hearne Lake map-areas, District of Mackenzie, NWT; J.B. Henderson.
- 354 Results of analysis on rock specimens from the Hazen, Cape Phillips, Irima and Eids Formations and from the Undivided Allen Bay and Read Bay Formations in the Canon Fiord Region of Ellesmere Island, Arctic Canada; H.P. Trettin.
- 356 Surficial geology, southeast Keewatin; W.W. Shultz, I.M. Kettles, L. Arsenault; Preliminary drafts of four surficial geology maps of part of southeast Keewatin showing the distribution of surficial materials and landforms with an expanded legend that provides additional information on the various map-units.
- 357 Surficial geology and geomorphology, Somerset, northern Prince of Wales and adjacent islands; J.A. Netterville, A.S. Dyke, R.D. Thomas.
- 358 Geological map and legend of part of Wollaston Lake fold belt; Saskatchewan; F.W. Chandler, K.K. Mukherji.
- 385 Mackenzie Valley near surface temperature measurements; R.A. O'Neil.
- 388 Uranium reconnaissance program: Orientation studies in uranium exploration in the Yukon; I.R. Jonasson, W.D. Goodfellow.
- 389 Unedited paleontological reports and biostratigraphic zonation of 14 wells drilled in northern Canada.
- 390 Biophysical land classification, Boothia Peninsula and Northwest Keewatin; C. Tarnocai, A.N. Boydell, J.A. Netterville, K.A. Drabinsky.
- 399 Geological map of parts of the Yukon and districts of Mackenzie and Keewatin; D.K. Norris and C.J. Yorath.
- 400 Surficial bedrock geology, King Christian Island, District of Franklin; J.R. Balkwill and K.J. Roy.
- 402 Geological maps of Blackwater Lake (96 B) and Fort Norman (96 C) District of Mackenzie; D.G. Cook and J.D. Aitken.
- 421-425 Mackenzie Valley geotechnical data bank (hard copy); D.E. Lawrence and D.A. Proudfoot.
- 426 Aeromagnetic survey data — Baffin Bay,

North Atlantic and Arctic oceans and Hudson Bay.

427 Data on geothermal areas, Yukon, NWT and northernmost British Columbia; J.T. Cran dall and T.L. Sadlier-Brown.

431 Biostratigraphic determination from the subsurface of the districts of Mackenzie and Franklin and the Yukon; J.W. Andrechuk.

433-443 Eleven 1:50 000 scale maps illustrating the geology of the southern half of Barrow River map area (46 O.P.), NWT.

444 Geochemical orientation studies in southern Baffin Island; YT Maurice.

445 Geology of the Bear-Slave structural provinces; 1:1 000 000 map; J.C. McGlynn.

447 Geology of Keskarrah Bay, NWT (86 H/2, 3, 6, 7); J.B. Henderson.

448 Terrain overview along ALCAN pipeline route.

"A" Series Maps

1380A Geology, La Biche River, District of Mackenzie; R.J.W. Douglas.

1396A Geology, Pond Inlet and Nova Zembla Island, District of Franklin; G.D. Jackson, A. Davidson, W.C. Morgan.

1403A Geology, Franklin Bay-Mallock Hill, District of Mackenzie; C.J. Yorath, H.R. Balkwill.

1406A Lower Paleozoic Geology, Central and Eastern parts of Foxe Basin and Baird Peninsula, Baffin Island, District of Franklin; H.P. Trettin.

1407A Lower Paleozoic Geology, northeastern Melville Peninsula and adjacent islands, District of Franklin; H.P. Trettin.

Preliminary Maps

5-1974 Surficial geology, Tuktoyaktuk area, District of Mackenzie; V.N. Rampton, M. Bouchard.

7-1974 Geology, Watterson Lake (west half), District of Keewatin; K.E. Eade, F.W. Chandler.

Energy Policy Sector

Northern Pipeline Studies

Review of 1976-77

During the year, the northern pipeline studies program previously under the direction of the Environmental-Social Committee was completed. This program was instrumental in the preparation and publication of some 400 reports on all aspects of environmental and social matters related to northern pipeline

proposals. The Environmental-Social Committee was a component of the Task Force on Northern Oil Development, an inter-departmental group, established in December 1968 to advise the federal government on all regional and national matters relating to northern oil and gas development. The policy advisory responsibility of that task force is being continued under the direction of the Interdepartmental Committee on Oil. Environmental and regional socio-economic research and studies relative to northern pipelines came under the direction of the Senior Management Committee, Northern Pipelines Projects in which the departments of Indian and Northern Affairs, Energy, Mines and Resources, Environment, the Yukon Government and the Northwest Territories Government are represented. The committee will continue the program of the previous Environmental-Social Committee and its studies are now directed towards the Polar Gas Project and the Alcan Pipeline Project.

Under the direction of the Interdepartmental Committee on Oil, an economic analysis program relative to northern gas pipeline proposals continued throughout the year. This work was conducted in preparation for release of reports by the Berger Inquiry into the Mackenzie Valley Pipeline and the National Energy Board relative to applications to construct pipelines for shipment of Mackenzie Delta and Alaska gas.

Plans for 1977-78

Activities of 1976-77 will continue. Advisory assistance will be given to groups studying native land claims and transportation in the North. Resources allocated to northern activities in the Mineral Development Sector:

tion of the National Mineral Inventory continued to be improved with up-dated and additional information. By the end of 1976 the inventory contained the following number of deposit descriptions: in the Yukon — 574; in the NWT — 1402.

The section's computerized data base now includes reserve tonnages and grade for 61 Yukon deposits and 98 deposits in the Northwest Territories. This represents an overall increase of six per cent in the total number of deposits recorded in the inventory during the past year. Closer liaison has now been established with the Department of Indian Affairs and Northern Development in order to ensure a free exchange of consistent information about northern mineral resources.

Throughout the year, the Mineral Development Sector has contributed to the work of developing a Canadian mineral strategy.

Much of the material in the proposed policies bears directly upon northern development. In addition, special internal studies were prepared on native peoples in the labour force; the mineral industry of the territories, and on comparisons between the Canadian and Russian Northlands.

Plans for 1977-78

Activities of 1976-77 will continue. Advisory assistance will be given to groups studying native land claims and transportation in the North. Resources allocated to northern activities in the Mineral Development Sector:

	1976-77	1977-78	
M.Y.	\$1000's	M.Y.	\$1000's
2.6	80	1	32

Mineral Development Sector

Review of 1976-77

Activities related to the North in which the Mineral Development Sector participated were concerned with policy advice and with special study groups or interdepartmental committees dealing with:

- Inuit land claims
- Northern transportation
- Northern road systems and resource road planning
- Arvik Mines
- Nanisivik Mine
- Processing the North's base metal production.
- The Yukon and Northwest Territories sec-

Earth Physics Branch

Responsibilities

The objective and responsibility of the Earth Physics Service Activity is: "To ensure the availability of geophysical information concerning the configuration, evolution, structure and dynamical processes of the solid earth and the hazards associated with natural and induced geophysical phenomena with special reference to the Canadian landmass". The Branch is organized into three operational

divisions: the Division of Seismology and Geothermal Studies, the Division of Geomagnetism, and the Gravity and Geodynamics Division. Within this organizational framework five discipline-oriented services carry out the mandate of the Branch throughout Canada, including the necessary operations north of 60°.

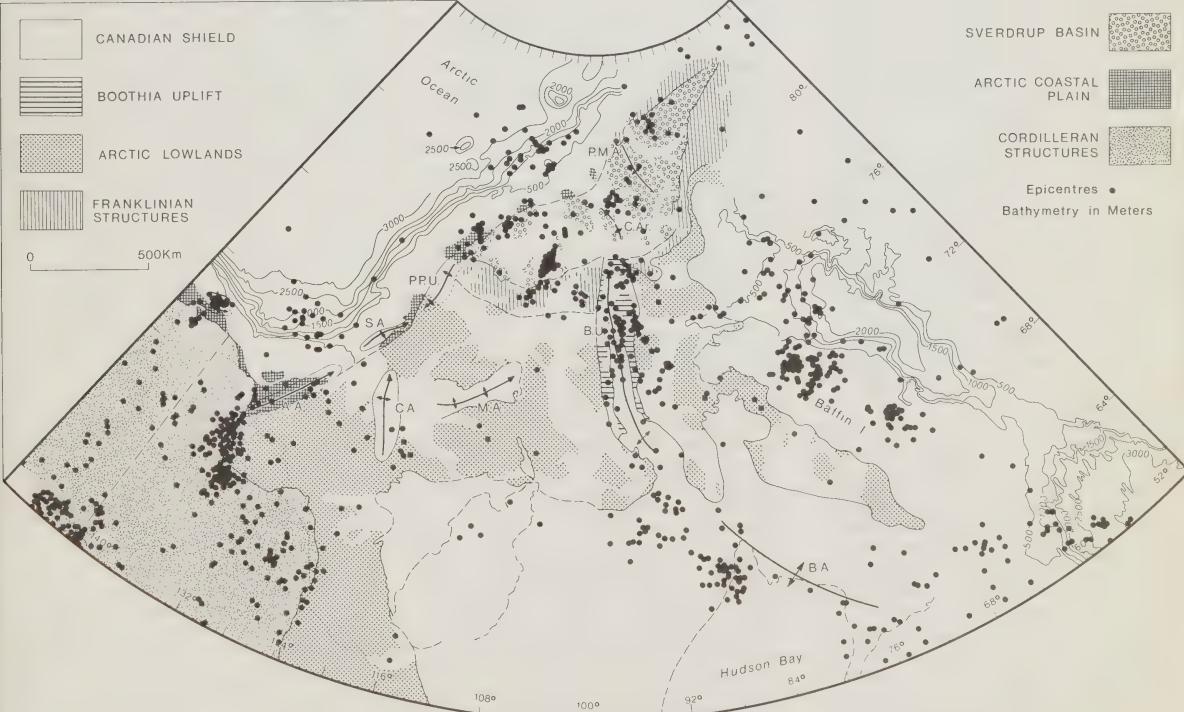
Seismological Service of Canada

Responsibilities

The Seismological Service of the Division of Seismology and Geothermal Studies is responsible for determining the parameters of

all significant earthquakes in northern Canada and for providing assessments of earthquake risks. Research on the structure and properties of the Arctic lithosphere is conducted by deep-sounding experiments (often in co-operation with the Polar Continental Shelf Project), by surface wave dispersion studies and by study of seismic wave velocities from Arctic earthquakes. Studies of the source mechanisms of moderate and large earthquakes in active seismic zones provide data for investigations of seismotectonic processes and for calculations of expected strong ground motions required for earthquake-resistant design

of critical structures. To meet these objectives, a network of seismograph stations is maintained in northern Canada; field experiments on deep seismic sounding and microseismicity are conducted.



Epicentres of earthquakes in northern Canada located by the Earth Physics Branch during the period 1962 - 1974, superimposed on the general geological provinces

Review of 1976-77

Standard seismological observatories were operated at Alert, Mould Bay, Resolute, Frobisher, Inuvik, Yellowknife and Baker Lake. Regional observatories continued operation at Whitehorse and at Igloolik, the latter with co-

operation from the staff of the Igloolik Research Laboratory. The strong motion seismograph continued operation at Fort McPherson. The Yellowknife seismological array continued operation and the automatic data transfer facility continued to send digital infor-

mation on detected seismic events to the Ottawa computer on a daily basis.

Routine analysis of all detected earthquakes occurring in the Canadian North has continued. Bimonthly lists of all detected earthquakes are prepared within about six

months of their occurrence; final determinations are published in annual catalogues. Rapid determinations are made of earthquakes of special concern or scientific interest such as the magnitude 5 1/2 earthquake on northern Baffin Island that was felt at Clyde on November 12, 1976.

A general review of northern Canadian seismicity has been completed (see figure) and correlations have been found between earthquake clusters and a number of geological and geophysical features. Detailed investigations have been made of earthquakes in the Byam Martin Channel northeast of Melville Island and in the Beaufort Sea, and the earthquake fault plane solutions have been related to the local tectonic fabric in these areas. The results of these investigations provide basic data for research on the seismotectonics of Arctic Canada and essential data for assessments of earthquake risk in resource development areas.

A seismic refraction crustal survey was conducted in the Beaufort Sea during April and May 1976 in conjunction with the AIDJEX program. The field procedure adopted will allow a structural interpretation and an estimate of the velocity anisotropy of the oceanic crust. Transportation of men and equipment over the broken, mobile ice floes required both a 205-helicopter and a twin-otter aircraft to obtain the required number of explosions before serious drifting of recording sites occurred.

Plans for 1977-78

The present seismological observatories will be maintained except that the standard observatory at Baker Lake will be converted to a regional station and photographic recording will stop. A new regional observatory is tentatively planned for installation on northern Baffin Island. The Yellowknife seismological array will continue operation. These facilities will continue to contribute data to Canadian and international seismological research programs.

Analysis and publication of earthquakes occurring in northern Canada will continue on a current basis. An investigation will be made of the seismicity of the Beaufort Sea and its potential relationship to basement structures on the continental slope. A study will commence to assess the completeness, reliability and characteristics of the seismicity of the southwestern Yukon in areas of proposed pipeline corridors. Detailed study of larger northern Canadian earthquakes will continue as data and records become available.

Background research will commence to evaluate methods of seismic risk mapping for the next version of the Seismic Zoning Map of Canada. This will be particularly important for the northern region for which the earthquake data base was very limited at the time of derivation of the current version of the Seismic Zoning Map.

Planning will continue for the earthquake monitoring and seismic reflection-refraction experiment components of a multidisciplinary study of the Lomonosov Ridge during 1978.

Geothermal Service of Canada

Responsibilities

The Geothermal Service of the Division of Seismology and Geothermal Studies is responsible for determining the thermal regime of the Canadian landmass, particularly as it is related to geotectonics, the distribution in depth and areal extent of permafrost, the thermal properties of earth materials, and the potential for geothermal energy development. In line with these responsibilities, measurements of the thermal properties of earth materials are carried out in the laboratory, field measurements of temperature are carried out in drill holes, and field and laboratory measurements of the natural heat production are made on selected rocks.

Review of 1976-77

Studies of the underground thermal regime of northern Canada have continued, in response to continuing emphasis on natural resource and transportation concerns.

The geothermal group have now published a total of 78 permafrost thickness determinations based on deep temperature measurements in northern drillholes. Eight new determinations were made in the Mackenzie Delta in 1976-77, bringing the total number of determinations in that area to 33. Permafrost thickness has been found to vary widely within certain limited regions, ranging, for instance, from 65 m to 600 m in the onshore Mackenzie Delta.

As an aid to the interpretation of these subsurface temperature measurements, numerical models have been developed to determine such physical parameters of the surrounding formation as ice content, porosity, pore-water salinity and lithology.

The possible occurrence of natural gas as a frozen hydrate has been confirmed and studies to delineate its extent in northern Canada have continued. Combined seismic and thermal studies of the permafrost and

hydrates beneath the offshore areas of the Beaufort Sea in conjunction with the Geological Survey of Canada have allowed the mapping of a distribution pattern which is closely related to the combined history of water-and ice-cover. A hydraulic jet-drill has been developed jointly with the Geological Survey in order that subsea drilling may be done economically. This equipment has been used to drill five holes to a depth of 60 m below the sea-bottom in water depths of up to 15 m.

Shallow thermal studies of the near-surface regime have continued in the Beaufort Sea during a joint cruise with Beaufort-Delta Oil Project Ltd., and elsewhere in the Arctic with the CSS *Hudson* 1976 cruise through Arctic channels.

The latter study together with studies of the permafrost distribution at Arctic shorelines in the vicinity of Byam Martin (with Montreal Engineering Ltd.), and of Little Cornwallis (with Arvik Mines Ltd.), plus measurements of ground temperatures in eastern Melville and the Keewatin (with NRC, Polar Gas Ltd., and Cominco Ltd.) have been in support of the assessment of northern pipeline corridors, and funded through the TEP-2 program of the *Environmental-Social Program on an Arctic Pipeline*. All the above studies have been conducted as part of a multidisciplinary effort to understand processes in northern terrains. In support of this effort, measurements of the thermal properties of frozen and unfrozen soils and rocks have continued routinely. All the available data on such materials are being collected and analysed to seek for universal models connecting thermal and other physical properties.

Plans for 1977-78

The program of geothermal studies will continue to keep pace with the rapidly expanding field of northern resource development by focusing its attention on areas under the most intense pressure, i.e., the Beaufort Sea and the projected northern pipeline corridors. New projects continue to be multidisciplinary in nature, combining thermal with other geophysical methods.

A large program of hydraulic drilling from the surface in co-operation with the Geological Survey is planned for the spring. The subsurface data should resolve the ambiguity between hydrate and permafrost identification in several areas and positively identify the nature of permafrost beneath Shallow Bay in the Mackenzie Delta. A summer program will help quantify the year-round near-surface thermal conditions.

Temperature logging of deep wells in the Mackenzie Delta and the Arctic Islands will continue as wells are made available. The reconnaissance aspects of these studies is however largely completed. Work will continue for the acquisition of further subsurface temperature data at northern shorelines in co-operation with Montreal Engineering and on the seabottom of Arctic straits and channels.

Measurements of the thermal properties of rocks and soils, both frozen and unfrozen will continue. For many locations no cored material is available on which to make these measurements and drill-cuttings must be used instead. Research is continuing on improved techniques of determining *in-situ* thermal properties from measurements on the cuttings and the analysis of well-logs.

The continued acquisition of field data and continued improvement of data acquisition techniques are essential to northern studies. New gradiometer probes for sea-bottom work are being designed and constructed in the coming year for deployment in the following year.

Geomagnetic Service of Canada

Responsibilities

The Division of Geomagnetism is responsible for providing up-to-date information on the direction and intensity of the earth's magnetic field over Canada and adjacent ocean regions. The Geomagnetic Service, in addition to publishing magnetic charts of Canada, provides the information printed on aeronautical and marine charts and many other maps concerning the angle between true north and magnetic north, and its change from year to year — information which is essential for the navigation of aircraft and ships.

The surveys and analysis carried out by the division also delineate large-scale magnetic anomalies due to contrasts in the magnetic properties of rocks, and thus provide basic data for the investigation of geological structure, and for the more detailed commercial explorations for deposits of minerals, oil and gas. The magnetization acquired by rocks at their formation and throughout their subsequent history is analysed in field and laboratory studies to learn when and how geological structures were formed.

Knowledge of the evolutionary process is important in understanding how fossil fuel and mineral deposits originated and where they might be located.

The Geomagnetic Service is also responsible for recording and analysing rapid varia-

tions of the earth's field, with periods measured in hours or seconds. Eleven magnetic observatories record these changes continuously in Canada. Three of them are located in the auroral zone and four are in the polar cap north of the auroral zone. The rapid magnetic variations provide information on electrical currents in the ionosphere, and on the physical properties and dynamic behaviour of the magnetosphere. Such studies have practical applications in the North, in the fields of telecommunications, the transmission of electric power and the investigation of deep crustal structure by electromagnetic induction.

Review of 1976-77

A three-component airborne magnetic survey of eastern Canada was flown in late 1976. Parallel flight lines spaced 38 nautical miles apart covered southeast Baffin Island, Hudson Strait, Davis Strait and part of Baffin Bay, extending to the west coast of Greenland.

Magnetic observatories operated continuously through 1976-77 at Mould Bay, Resolute, Cambridge Bay, Baker Lake and Yellowknife. Three-component magnetometers, recording on digital magnetic tape, were installed at Pelly Bay, Rankin Inlet and Eskimo Point, to form part of a line of 11 magnetic stations extending from Alert in the North through Fort Churchill to Winnipeg in the south. This chain of stations, known as the "Churchill Chain" officially began contributing on September 1976 to the International Magnetospheric Study, 1976-79.

Rock samples for paleomagnetic analysis were collected in field studies in the Great Bear Lake and Great Slave Lake regions, in the eastern Yukon and the Mackenzie Mountains. A study of the Precambrian red beds of Somerset Island was completed. Geophysical data for the Arctic Basin were collected and analysed, including polar positions from paleomagnetic studies and large-scale magnetic anomalies from airborne surveys.

In March and April, 1976, 11 three-component magnetometers were operated simultaneously on a line extending 500 km from northern Banks Island to southern Victoria Island. The experiment, conducted with the assistance of the Polar Continental Shelf Project, is expected to locate the eastern boundary of an anomaly of electromagnetic induction centered on Mould Bay and to help explain the unusual electrical conductivity of the crust in this region.

Plans for 1977-78

Several magnetic repeat stations in the eastern Northwest Territories will be reoccupied to provide information on the annual change of the magnetic field. The magnetic observatories will continue operating as in 1976-77, except that Baker Lake will be converted to contract operation and photographic recordings will cease. Paleomagnetic field work is planned in the Snake River region of the Yukon, in the Mackenzie Mountains, at Great Bear Lake, Great Slave Lake, and in the Belcher Islands.

Gravity Service of Canada

Responsibilities

The Gravity Service of the Gravity and Geodynamics Division has the responsibility of completing the regional gravity survey of the whole of Canada. In the North, this work is performed in co-operation with the Polar Continental Shelf Project of EMR. Precise observations of gravity provide basic data for the mineral and oil exploration industries, for studies of sedimentary basins and for studies of the earth's crust and upper mantle. In addition, these observations provide data for geodetic studies and supply a need of the Department of National Defence. The service is responsible for establishing gravity standards throughout Canada by maintaining a first-order network of gravity stations to serve as a reference and as control points for all regional and detailed gravity surveys. Also the service maintains a data bank of all gravity data which meet national standards.

Review of 1976-77

Between mid-July and the end of August, 1976, about 10 500 line km of shipborne gravimeter measurements were added to the joint Canadian Hydrographic Service — Earth Physics Branch (DFE-EMR) multi-disciplinary marine survey of Hudson Bay which was commenced in 1975. This cruise aboard the CSS *Narwhal* began the interlining phase of the 45 km spacing completed last year.

Using helicopter support, more than 700 gravity stations and related water depths were observed during March and April, 1976 on the ice-covered surface of Amundsen Gulf and in the Beaufort Sea adjacent to Banks Island. As in previous surveys, station spacing was maintained at six km. This survey completed the regional gravity coverage in the general area of the Beaufort Sea and Amundsen Gulf. It was done in co-operation with the

Polar Continental Shelf Project, EMR, and the Canadian Hydrographic Service, DFE

A survey by contract comprising 500 gravity stations was done over the frozen surface of Great Slave Lake, NWT, during February and March, 1976. Approximately two-thirds of the lake was surveyed. Station spacing varied between three and six km.

Bathymetric and free air gravity maps at a scale of 1:7 500 000 on a polar azimuthal equidistant projection are being prepared for the Arctic region north of 60°N latitude to the North Pole and from 0° to 360° longitude. The bathymetric map was reduced from the American Geographical Society's map compiled by Heezen and Tharp of the Lamont-Doherty Geological Observatory. Unfortunately, investigation showed this map to be in error in some regions of the Arctic and revision of the bathymetric map is now in progress.

The free air map was compiled using mean free air anomalies (2° longitude 1/2° latitude) calculated from more than 119 000 gravity observations which cover about half of the area. The other half of the region was covered using the predicted 1° 1° mean free air anomalies of the Defense Mapping Agency Aerospace Center (DMAAC) of the U.S.A. This map was compared with a satellite free air gravity map using 5° 5° station values represented by spherical harmonic coefficients to degree 25 to verify the regional character of the gravity field as described by the diverse sources of gravity data used to compile the free air map.

A compilation of Phanerozoic vertical motion data from Arctic regions is virtually complete. Studies of Arctic evolutionary scenarios are in progress. Chief among the problems being considered are the whereabouts of northern Alaska before Tertiary time and the origins of the Lomonosov and Alpha-Mendeleev Ridges.

A study of gravity and magnetic data in Amundsen Gulf confirmed geological estimates of two to six km of possibly late Precambrian and younger sedimentary rocks beneath the Gulf. Major geophysical anomalies are attributed to sources within the Precambrian basement underlying the sedimentary rocks. North of Pearce Point the largest anomaly in the region (40 mgal, 600nT) is attributed to a basic to ultrabasic intrusive body of possibly Hadrynian age. The anomaly may be compared with the Darnley Bay anomaly about 100 km to the southwest. Intrusions underlying both anomalies may be

sources of Hadrynian dykes, sills and flows throughout the Amundsen Gulf region.

Remote sensing (ERTS) imagery was used to map the distribution of leads in the sea ice of the Beaufort Sea during late February through early April in 1973, 1974 and 1975. A comparison of bearings and speeds of ice movements obtained from these ERTS-based maps with those of geostrophic winds calculated from average daily and weekly atmospheric pressure charts, indicates that the ice drifts at about 1/100 of the speed of the geostrophic winds in the direction about 20° to the left of the latter. During early March, 1973, before excessive ice break-up, the sea ice moved slowly, about 0.3 km/day, but during periods of rapid ice-fracturing (March and April 1975) the sea ice moved at rates as high as 18.2 km/day. This study was carried out in support of a proposed seismic-gravity profile across the continental shelf to the ocean deep to elucidate the structure in the vicinity of the continental break.

Plans for 1977-78

The shipborne gravimeter survey of Hudson Bay will be continued in 1977.

Starting in March 1977 the regional gravity coverage of ice covered waters in the Arctic will be extended to Viscount Melville Sound and M'Clure Strait areas. At least two years of work is anticipated in this region.

A brief visit to the Haughton Dome in Devon Island planned originally for 1976 will take place in 1977. The Haughton Dome is an impact structure first recognized in 1974. Further rock samples will be collected and a detailed gravity survey of the structure will be made. Interpretation studies in the Arctic will be continued in 1977.

Geodynamics Service of Canada

Responsibilities

The Geodynamics Service of the Gravity and Geodynamics Division has the responsibility of developing a better understanding of the dynamics of the solid earth and associated natural and induced geophysical hazards, and of ensuring the availability of crustal deformation, earth rotation and polar motion data for the Canadian landmass.

Review of 1976-77

Precise measurements of the dynamics of ice floes were continued in the Beaufort Sea throughout 1976-77, as part of the Geodynamics Service contribution to the AIDJEX program.

The Geodynamics Service also participated in a program of satellite Doppler tracking of the GEOS-3 satellite over Hudson Bay from September to December 1976. The observations were necessary for the success of a joint experiment involving seven other institutions designed to measure ocean tides and sea-surface topography in Hudson Bay by radar altimetry from the GEOS-3 satellite.

Plans for 1977-78

Analysis of field results from the AIDJEX ice floe experiments will be carried out. No further field work is planned. A feasibility study will be carried out at the LG-2 reservoir, Que. for an experiment to measure the crustal deformation associated with the reservoir load.

Canada Centre for Mineral and Energy Technology

Physical Metallurgy Research Laboratories

Activities relevant to northern development are grouped into two major projects, one covering the characteristics of metals and alloys for engineering applications in the Arctic, and the other dealing specifically with oil and gas pipelines.

Metals and Alloys for Use in the Arctic

A monograph intended to provide guidance and technical data for designers and builders of structures, vehicles and equipment for the North prepared in draft as a laboratory report last year is now available to the public as CANMET Report 76-1 (issued January 1976).

The low temperature performance of bridges and other structures fabricated of weathering steels can be affected by the notch ductility made in these structures. Study of the latter has continued with welds made at low and relatively high energy input levels with the automatic CO₂ gas metal-arc process and a 2.5 per cent nickel, flux-core electrode. Satisfactory impact properties were obtained down to 0°C, and in fact were much superior to those obtained with the electrode used previously. Spectrochemical analyses of welds confirmed the suitability of the 2.5 per cent nickel electrode with respect to weathering behaviour.

The work on the expulsion-bulge testing of an extensively used medium strength structural steel and of three high strength steels has demonstrated the importance of small

surface notches causing premature failure, whether these are accidental or characteristic of the welding process. A draft report was prepared of the comparative study of notch-ductility and weldability of the three high-strength steels.

Work has continued in the areas of corrosion and environmental cracking (EC). Collection of atmospheric and sea water corrosion data was essentially completed, and it was concluded that it is feasible to perform corrosion tests in the Arctic. A summarizing report is being prepared. Evaluation was continued of wire-on-bolt devices, designed to yield a general index of atmospheric corrosivity. Research on the EC susceptibility of parent and welded HY-130 steel was virtually completed. The results indicate that currently produced HY-130 is a good candidate for use in advanced marine applications.

Metals and Alloys for Fuel Transmission Pipelines

The objective of this project is to ensure the structural integrity of oil and gas pipelines in the North in order to minimize environmental damage and to maintain operational efficiency. There are two approaches being taken in this area. One involves the evaluation of line pipe of Canadian and foreign manufacture, the second the development of weldable higher strength line pipe steel of improved notch toughness.

Sixteen samples of line pipe up to 121.9 cm diameter, up to 3.1 cm wall thickness and up to 12 m length, fabricated by various processes have been obtained. Nine of the samples were manufactured to conform to tentative specifications for Mackenzie Valley pipelines and may be categorized as candidate pipe. The evaluation procedure includes nondestructive inspection and the determination of residual stresses, the level and uniformity of the mechanical properties, the nature and degree of uniformity of the microstructure, the properties and quality of the seam weld and assessment of field weldability, fracture toughness, fatigue strength, and environmental cracking resistance.

Two further candidate line-pipe steels have been added to the list under study, these two being representative of steels made to specific standards for Arctic line pipe.

Implant testing, found to be a useful investigational tool, has shown that there is a wide range in the different levels of susceptibility of the candidate steels to hydrogen-induced HAZ cold cracking. Parallel weldability testing with the CTS test has continued, but some

low-temperature testing has to be done in winter conditions outdoors because of a breakdown of the cold-room facilities. Overall, the weldability program shows that preheating will be advisable for field welding, at least for some of the pipeline materials, to avoid undue hardening and the possibility of HAZ cracking.

An analysis of fatigue crack extension in an oil pipeline based on previously measured fatigue crack growth rates in sour crude oil and an actual operational spectrum of pressure fluctuations has shown that life can be limited by corrosion fatigue when a deep enough initial crack-like defect is present in the pipe. Long defects deeper than 0.6 mm or eight per cent of wall thickness (for the subject pipeline with a 7.1 mm thick wall) can grow to the critical depth for failure in less than the 30 years expected for pipeline life (Report MRP/PMRL 76-25(J)).

An experimental study of the effects of salt water environment on fatigue growth rates in HY-130 steel is less than half of that found in previously tested, lower yield strength, X-65 line-pipe steel.

Residual stress measurements in spiral weld Grade 70 line pipe have shown, in material mid-way between the weld seams, tensile stresses as high as 17 ksi and compressive stresses as high as 20 ksi. Near the weld seams, residual tensile stresses as high as 65 ksi have been found.

Dynamic stress-time traces for fractures through a pipe wall have been obtained from shallow-cracked specimens of Grade 65 steel instrumented with strain gauges and broken by a heavy falling weight. At a Charpy V-notch energy level of 3.7 m/45 kg low stress failure was possible with a dynamic crack less than 15 per cent of the wall thickness (1.2 cm) deep. At a Charpy level of 9 m/45 kg and the same crack depth, a very brittle fracture occurred but it was not a low stress failure because the nominal stress at the crack was about twice the low strain rate yield strength. A strain amplification from a distortion of pipe geometry as a result of mechanical damage or other causes would appear to be required for failure from shallow cracks at this Charpy energy level.

Research on the sulphide stress cracking (SSC) of pipeline steels was continued. It was observed that SSC failures in laboratory tests contained both brittle and ductile components. This has facilitated interpretation of experimental results and emphasized the potential importance of this line of research.

Research was continued on the effect of environmental factors, such as temperature,

solution composition, and potential, on stress corrosion cracking (SCC) of a typical line-pipe steel, designated F.

Work continued on the development of a high strength (700 MPa) steel which has suitable toughness, weldability and production economy for Arctic line-pipe applications. Five types of micro-alloyed steels have been investigated (Nb, Mo-Nb, Mo-Nb-V, V, V-N). All material was controlled rolled to plate and either direct quenched, or air cooled, re-austenitized and quenched. The effects of additional thermomechanical treatment were also studied. The best combination of strength and impact toughness was obtained for the Mo-Nb steel in the direct quenched and aged condition. Micro-structural studies indicated that the good properties can be attributed to a fine (1 m) subgrain structure, a low volume fraction of intergranular or grain boundary precipitate, and a high mobile dislocation density. Detailed studies were also made of the ductile fracture mechanism and the rolling textures for some of the experimental steels.

Plans for 1977-78

Further research on the notch-ductility of weathering steel weldments will be carried out. For welds made at low and relatively high energy input levels, some dynamic toughness testing is planned. Welding parameters will be established for producing sound welds at the highest level of energy input compatible with the 2.5 per cent nickel electrode, joint preparation and the welding equipment available. Welds made under these conditions will be tested by Charpy and dynamic toughness at the weld centre-line. An evaluation of heat-affected zones, representative of welds made at different levels of energy input, is planned using Charpy and dynamic toughness testing.

The report covering the comparative study of notch-ductility and weldability of three high strength steels will be completed. The explosion-bulge testing of the medium strength structural steel will be detailed in a separate report, intended as a supplement to a previous report of an evaluation of the notch-toughness of welded joints produced by various processes.

The line pipe evaluation project will proceed along the lines indicated above to complete the evaluation of samples on hand and with the addition of one further sample of Canadian-produced candidate pipe.

In the area of fatigue and fracture of pipelines, three investigations are planned. Instrumented, dynamic tests are to be done on

shallow cracked specimens about 23 cm long by 8 cm wide of a Grade 70 line-pipe steel at various temperatures in the transition temperature range. A study of environmental effects on fatigue crack growth is planned for a high strength low alloy X-70 line-pipe steel. An investigation of corrosion fatigue crack growth rates in salt water of HY-130 steel welds similar to that done on parent material, is in progress.

In the field of corrosion and environmental degradation, work will proceed in four areas. Tests will be completed on wire-on-bolt devices, designed to yield a general index of atmospheric corrosivity, during the summer of 1977. If characteristics are deemed suitable, a large number of devices will be prepared and arrangements will be made to have one-year exposure tests performed at a large number of sites in both the Arctic and southern Canada. The assessment of HY-130 steel will be completed by performing a few measurements on welded specimens. A summarizing report will be prepared. Using methods developed previously, the susceptibility to sulphide stress cracking (SSC) of parent, weld, and weld-HAZ microstructures will be investigated for several different line-pipe steels of interest to Canadian industry. Recently produced higher strength grades will be given priority. Research on stress corrosion cracking (SCC) of line pipe steels will be expanded to include the development of methods to evaluate a number of different line-pipe steels used in Canada. Studies of environmental effects on SCC will be continued.

In the area of ferrous metallurgy of new pipeline steels, future work will concentrate on the type of steel and the processing sequence which gave the best results in the initial screening tests. During 1977-78 two principal problems will be investigated. Firstly, an alloy optimization study will be carried out to determine the effects of varying three of the alloy elements (C-Mo-Nb). Eight experimental heats will be prepared representing various levels of these elements, evaluated with respect to strength, toughness and microstructure, and the results analysed according to a nonreplicated factorial design. The second area to be studied will be the weldability of the quenched and tempered steel. Suitable weldments will be prepared and evaluated with respect to toughness and microstructure. Particular attention will be paid to the weld heat affected zone.

Mineral Sciences Laboratories

Review of 1976-77

The Chemical Laboratory has analysed 35 line pipe steels on behalf of the Physical Metallurgy Research Laboratories.

CANMET has just completed a two-year, \$500 000 project on the removal and recycling or destruction of cyanide from gold mill effluents. This work was undertaken at the request of six gold mining companies and the federal Department of Fisheries and Environment. The mining companies provided \$100 000 of financial support. One of the participating companies was Giant Yellowknife Mines Ltd.

The problem has been that the proposed limit of cyanide concentration in mill effluents was attainable only with great difficulty by some proposed methods and not at all by others. CANMET agreed to review the alternative methods proposed in the literature, select the most promising routes, develop operating parameters for real solutions and provide an assessment of each route.

The CANMET project has compared the most feasible methods for cyanide effluent control, demonstrated these methods on bench scale and at a small pilot plant scale, operated with these techniques on real solutions from each participating company, and prepared a brief economic assessment of the alternative methods in a final report to the participating companies.

The Department of Economic Development and Tourism of the Government of the Northwest Territories contacted CANMET in mid-1976 to seek advice in evaluating a proposal to recover nickel from mill tailings at Rankin Inlet. The proposal was reviewed, but did not appear to be viable, based on the information provided.

Mining Research Laboratories

Review of 1976-77

Continued support was given on a reduced scale to the mine inspectorate, DIAND, on dust sampling and evaluation procedures for northern mines. Consultative services were provided and some 50 dust samples were analysed for quartz by the X-ray diffraction method.

Plans for 1977-78

Continued support will be given to the dust sampling program in northern mines until northern facilities are established and are able to cope with dust survey requirements.

A report on the results of the co-operative work is planned.

Surveys and Mapping Branch

Responsibilities

The Surveys and Mapping Branch is responsible for developing and implementing national programs in surveying and mapping. These programs involve the following support activities:

the production, maintenance and distribution of topographical and special maps for administration, economic, human and physical geography, resources management, scientific research, defence and recreational purposes;

the establishment and maintenance of a national network of geodetic control for topographical, engineering, cadastral, navigational, communication, military and scientific purposes, and the distribution of this data;

the production and distribution of a national atlas to document the physical, human and economic geography and the appropriate geographical aspects of the history of Canada for use by governments, educational institutions and the public;

the administration of cadastral (property) surveying of federal lands;

the fulfilment of Canada's federal obligations regarding definition, survey and maintenance of political boundaries in Canada;

the reproduction, distribution and library services for aerial photography and remote sensing data;

the production, maintenance and distribution of aeronautical charts and publications for civil and military aviation;

the support for other federal programs requiring a wide range of surveying and mapping services.

The five main components of the branch are: Topographical Survey, Legal Surveys, International Boundary Commission (Canadian section), Geodetic Survey, and Map Production.

The Director-General of the Surveys and Mapping Branch is the Chairman of the Inter-departmental Committee on Air Surveys. The branch also provides the Secretariat for the Canadian Permanent Committee on Geographical Names.

Topographical Survey

Responsibilities

To produce, maintain and distribute topographic maps of Canada for general purposes at scales of 1:250 000 and larger, appropriate to the needs of resource development, regional and urban planning and development, environmental management, engineering construction, national defence, and recreation; to provide a national library for aerial photography and remote sensing data, to promote their use and to provide a service for processing, reproduction and distribution; to provide technical and administrative support to the Interdepartmental Committee on Air Survey.

Review of 1976-77

In 1976 a total of 4 506 line km of aerial photography was flown in the North for 1:50 000 new mapping. Indexes showing present status of aerial photography may be obtained from the National Air Photo Library, 615 Booth Street, Ottawa, Ontario K1A 0E9. Topographic map indexes are also available from the Canada Map Office at the same address.

In the North, 138 new 1:50 000 line maps and 77 new 1:30 000 photomaps were completed. In northern Canada some maps were revised by the addition of data located on LANDSAT (land satellite) imagery.

During the year, the directorate continued with its plan to carry out part of its new mapping program to the data base stage only. In the aerial survey data base concept, aerial photography, field control computations and photogrammetric block adjustments are completed for all map sheets in the program, but only those needed immediately are carried on to map compilation and publication. Data for the remainder is stored in digital and hard copy form until specifically required for map compilation or engineering studies. This reduces the response time to a request for a particular map or area. The establishment of the aerial survey data base includes the identification on aerial photography of a network of points (spaced at about 6 km intervals) for which the precise latitude, longitude and height above sea level are determined photogrammetrically. This network will cover all areas of the North, and though it will be used principally for mapping, it may have secondary uses, for example, the location of mineral claims and property boundaries. Completion of this network will take about three years.

Planning, monitoring and inspection of surveying and mapping contracts with the survey

industry on behalf of various federal departments and agencies were carried out.

Plans for 1977-78

It is anticipated that 84 new 1:50 000 map sheets of areas in northern Canada will be plotted by Topographical Survey and 15 of 1:250 000 sheets will be revised in 1977. 16 898 line km of photography will be flown for 1:50 000 mapping in the NWT and Yukon.

A brochure has been published on wilderness canoeing which should encourage this form of tourism in the North. Care and safety on the waterways are stressed.

In 1977, Topographical Survey Directorate bought a Gestalt Photomapper. While this instrument will be used primarily to produce contour lines automatically, one by-product of its output will be a very dense network of spot heights that will be stored in digital form (Digital Terrain Model). The photomapper operates only on terrain that is not tree covered, for this reason it will be used initially for northern mapping. Consequently, in a few years, Topographical Survey will have dense Digital Terrain Models of some areas of northern Canada.

Legal Surveys Division

Responsibilities

To carry out surveys for land or resource transactions connected with the administration and development of public or other lands.

To ensure the competence of the property surveys, land descriptions and plans made under the Canada Lands Survey Act and other acts and regulations, and to manage such surveys on request.

To fulfill the federal obligations regarding definition, survey and maintenance of provincial and territorial boundaries in Canada.

Review of 1976-77

Yukon Territory

For the Department of Indian Affairs and Northern Development summer residential subdivisions were surveyed at Teslin Lake (60 lots), Marsh Lake (86 lots), Little Salmon Lake (6 lots) and Jackfish Bay (11 lots), and residential subdivisions were surveyed at Haecel Hill (21 lots) and Deep Creek (20 lots), both on the outskirts of Whitehorse.

Individual lots were surveyed for the Yukon Forest Service at Mendenhall River, Frances Lake and Teslin.

For Parks Canada, a part of the boundary

of the new Kluane National Park near Haines Junction was surveyed.

Resurveys were made at Mayo (2 lots), Haines Junction (3 lots), Carmacks (2 lots) and Teslin (1 lot).

Inspection surveys were carried out at Riverdale subdivision (Whitehorse) and at Teslin Lake, and a contract survey at Ross River was monitored.

Monuments of the Whitehorse Co-ordinated Survey Area were inspected as part of the regular maintenance program. A new Co-ordinated Survey Area was surveyed at Ross River.

Northwest Territories

For the Department of Indian Affairs and Northern Development summer residential subdivisions were surveyed at Prelude Lake (23 lots), Pickerel Lake (10 lots), and Awry Lake (7 lots), and parking lots were surveyed at Madeline Lake.

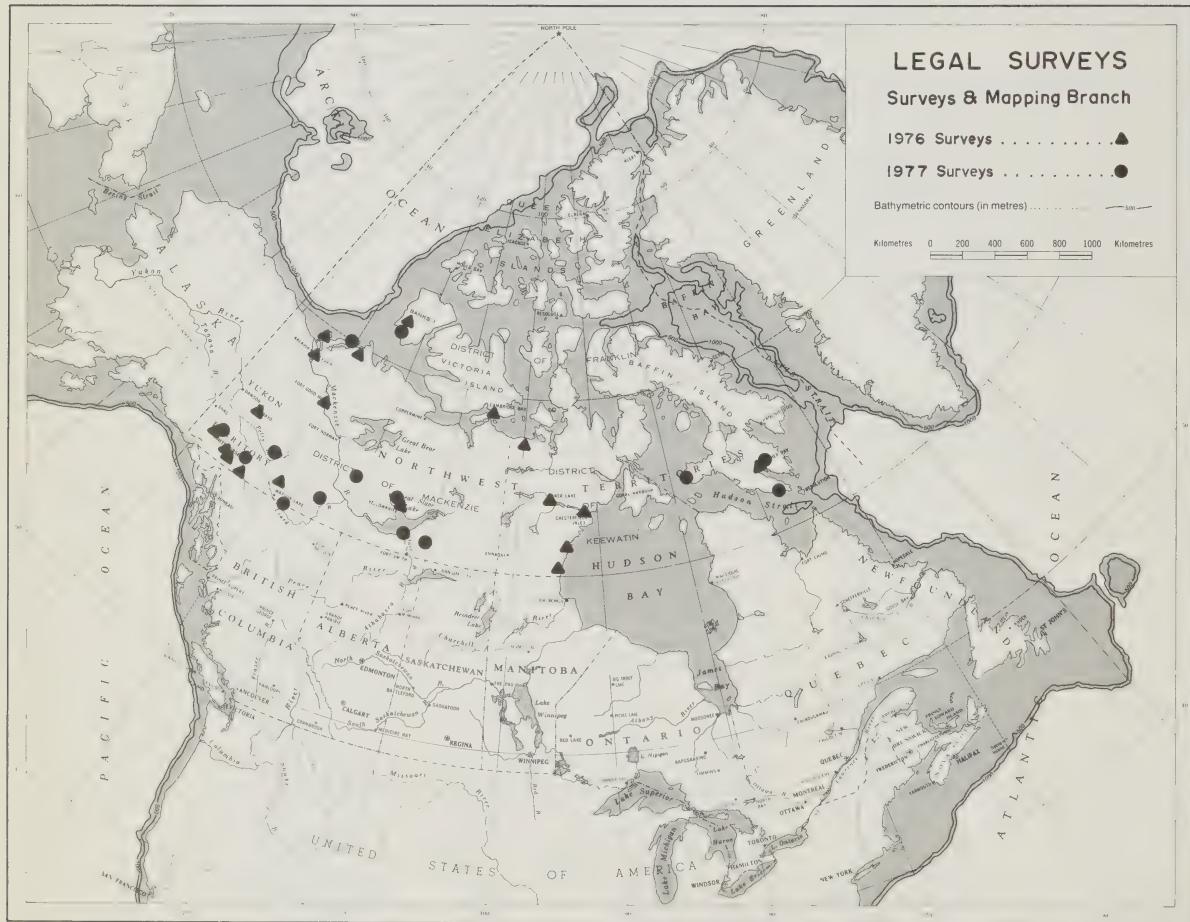
Lots were surveyed for the Royal Canadian Mounted Police at Frobisher (3 lots), Fort Good Hope, Cambridge Bay and Rankin Inlet.

Two lots and a right of way were surveyed at Chesterfield Inlet for the Northern Canada Power Commission.

Contract surveys were inspected at Madeline Lake and monitored at Fort McPherson.

For the Department of Energy, Mines and Resources, seismic sites were surveyed at Baker Lake and Frobisher. The surveys of the Co-ordinated Survey Areas at Frobisher and Inuvik and a new Co-ordinated Survey Area at Rankin Inlet were completed. Co-ordinated Control Survey Areas established in the major settlements of the North feature an integrated system of durable reference monuments which can be used to facilitate and correlate in these settlements all future surveys required for engineering, mapping, cadastral and other development purposes. Because of the referencing role of these monuments, extraordinary precautions, such as setting markers in cast iron wells beneath streets, are taken in an attempt to ensure that they will not be disturbed by construction, grading or snow plowing work.

For the Department of Fisheries and Environment, maps were prepared showing Blyot Island, Queen Maud Gulf, McConnell River, Anderson River Delta and Banks Island No. 1 Migratory Bird Sanctuaries.



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Produced by the Surveys and Mapping Branch
 Department of Energy, Mines and Resources, Ottawa, Canada

Plans for 1977-78

Yukon Territory

For the Department of Indian Affairs and Northern Development the boundaries of Indian Reserves at Teslin and Burwash will be surveyed and a cottage lot subdivision (14 lots) at Little Salmon Lake will be surveyed.

For the Yukon Forest Service, two lots at

Teslin, and a townsite near Grew Lake will be surveyed.

For the Department of Public Works, road realignment surveys will be carried out between Mile 883 and Mile 904 of the Alaska Highway.

Northwest Territories

For the Department of Indian Affairs and Northern Development subdivisions for cottage lots will be undertaken at White Beach Point (11 lots), Pontoon Lake (11 lots), Sandy Lake (41 lots), Cameron River (12 lots), Prelude Lake (24 lots), Tsu Lake (4 lots), Blackwater Lake (15 lots), Hidden Lake (25 lots), and Cli Lake (10 lots). Also five lots will be

surveyed at Hay River, for a federal market garden.

For the Royal Canadian Mounted Police, there will be surveys of individual lots for housing and office sites at Cape Dorset and Lake Harbour.

For the Forestry Service, individual lots will be surveyed for a radio repeater station on Nahanni Mountain, and for an office and warehouse complex at Tuktoyaktuk.

For the Northern Canada Power Commission one lot will be surveyed at Sachs Harbour.

For the Department of Energy, Mines and Resources, the extension of the Yellowknife Co-ordinated Survey Area will be completed, maintenance will be carried out on the Co-ordinated Survey Area at Hay River, and reconnaissance will be carried out for a proposed new Co-ordinated Survey Area at Tuktoyaktuk.

Geodetic Survey of Canada

Responsibilities

The Geodetic Survey is responsible for the expansion and maintenance of primary frameworks of horizontal and vertical control, and to establish the lower-order control survey networks and special surveys required for other federal government agencies, industry, environmental studies, engineering and geosciences, national security, the national mapping program, for the orderly development of the North.

Review of 1976-77

In the Northwest Territories, the Mackenzie River first-order level line was completed to Arctic Red River. The Doppler satellite positioning, started in 1974-75 continued, and nine new stations were established in the District of Mackenzie. In the western portion of the District of Mackenzie and the Yukon additional vertical and horizontal control was established for the 1:50 000 mapping program.

Plans for 1977-78

In Inuvik, NWT, a test net with several types of bench marks will be levelled twice during the year. The test results will help determine the most stable type of bench mark to be used on proposed first-order level lines between Dawson City, Arctic Red River, Inuvik and Tuktoyaktuk. The Doppler satellite positioning project will be continued with points established at spacing adequate for 1:50 000 mapping in portions of Baffin, Boothia and

Somerset islands. The Inertial Survey System will be used to provide a basic framework of vertical control throughout the western portion of the District of Mackenzie and the District of Keewatin. Existing lower-order survey control will be improved and additional vertical and horizontal control provided for the 1:50 000 mapping program, throughout this same area and on the islands of Boothia and Somerset.

Directorate of Map Production

Responsibilities

The directorate is responsible for the drafting and printing of maps of the National Topographic Series; the production of small scale maps, aeronautical charts and flight information publications; the design and cyclic production of the National Atlas of Canada; toponymic (geographical names) services; the provision of cartographic support services to federal and provincial government departments, and private agencies.

Review of 1976-77

The following National Topographic Series maps, in northern Canada were printed:

- 50 new monochrome maps at 1:50 000
- 23 new photomaps at 1:50 000

In the field of Small Scale Maps and Special Project mapping, the directorate produced:

- 14 revised Aeronautical Chart Bases at 1:500 000;
- one new J.O.G. (Joint Operations Graphics) at 1:250 000;
- 11 new I.M.W. (International Map of the World) at 1:1 000 000;
- 140 new Territorial Resource Base maps for Legal Surveys;
- one Yukon Territory map at 1:2 000 000;
- one Yukon Gazetteer map E & F at 1:40 000 000; and
- one New Index No. 3, multi-scales.

Publication of aeronautical charts and flight information publications was maintained. Production scheduled cyclic revision include Visual Pilote Charts, Enroute Charts, Enroute Supplements, Canada Air Pilot and Northern Supplement.

Work on research and base maps for the Fifth Edition of the National Atlas of Canada continued.

Cartographic support was provided in the way of:

- one Northern Hemisphere map for Canada Year Book (Statistics Canada);
- one Arctic Canada map, at 2.54 cm – 402 km for National Museums;

one NWT map at 1:4 000 000 for Canada Manpower;

one Mackenzie Valley Pipeline (English and French) map at 2.54 cm – 225 km for Indian Affairs and Northern Development;

one Electoral map of the NWT;

one Electoral map of the Yukon Territory;

two Electoral district maps for the NWT.

Plans for 1977-78

There are no plans for revision mapping at 1:50 000 multicolour or 1:250 000 multicolour maps. No new mapping at 1:50 000 (multicolour) is planned. Plans concerning the number of new 1:50 000 monochrome and photomaps are awaiting final approval.

Other plans include:

- nine new I.M.W. sheets at 1:1 000 000 and one Aero Chart base map at 1:500 000 and

one Northern Hemisphere (English and French) map at 1:20 000 000.

Polar Continental Shelf Project (PCSP)

Responsibilities

To do a long-term study of the continental shelf lying north of the mainland of Canada and north and west of the Canadian Arctic Archipelago (including the sea floor, the earth's crust, the mantle beneath it, and the waters above it) together with the islands of the archipelago, the straits and sounds between the islands and, where relevant, the adjacent mainland.

The study covers mainly those fields of survey and research for which the Department of Energy, Mines and Resources is responsible in other parts of Canada, wherever such a study is not more economically and efficiently pursued as a separate self-contained operation. It is also designed to include or to support to a considerable extent research in fields within the mandate of other government departments if such research is in the national interest and could not otherwise be done.

An important function of the PCSP is to co-ordinate and arrange for mutual or concerted action by various agencies whose diverse specialities or capabilities can be brought to bear on different but related aspects of a major Arctic problem or critical area of study; and to provide continuity of planning and operation for various studies which are short-term and focus on individual problems. Examples of these are the Beaufort Sea Program and the Eastern Arctic Island Pipeline Program.

Emphasis is placed on field research and survey, but basic laboratory or theoretical research is carried out as needed to aid in the investigations, or in the interpretation of field data; and equipment or technique development of experimentation is undertaken when relevant. In addition, the field activities of the project are made available, under certain conditions, to approved university and other non-government research groups.

Review of 1976-77

Field work was carried out from mid-February and mid-October, co-ordinated from Tuktoyaktuk in the Mackenzie Delta and from Resolute on Cornwallis Island.

Logistics for the Eastern Arctic Island Pipeline Program was co-ordinated from Resolute and resulted in a considerable increase in activity at the base camp. Completion of the Beaufort Sea Program led to a migration of activity from the western to the eastern Arctic. The Arctic Ice Dynamics Joint Experiment (AIDJEX) a joint program with the U.S. National Science Foundation, launched in 1975,

was completed in May, 1976. It was a successful operation that saw participation by eight Canadian scientific parties. The sea-ice reconnaissance flights over the archipelago were undertaken for the 15th successive year. The major hydrographic effort of the season took place in Penny Strait where 8705 soundings were taken and considerable data were obtained from a through-the-ice, continuous-profiling bathymetric device. Geological, biological and archaeological projects received considerable support from PCSP. Because of activity in the Arctic, a survey of several Thule sites was expanded, and interest taken in investigations of encampment sites at Franklin, Belcher and other islands. Geophysical investigations in the Beaufort Sea revealed the lateral and vertical extent of permafrost underlying the sea. A discovery of turtle shells and alligator skeletons in the Eureka Sound Formation on Ellesmere Island presents interesting ramifications to the Continental Drift Theory. In total, 102 scientific projects were supported by PCSP during the 1976 field season.

In addition to the Department of Energy, Mines and Resources, the following agencies were involved in, or received assistance from, the 1976 program of the Polar Continental Shelf Project:

Arctic Institute of North America
Defence Research Establishment Pacific
Department of Indian and Northern Affairs
Environment Canada, Arctic Biological Station
Environment Canada, Canadian Hydrographic Service
Environment Canada, Canadian Wildlife Service
Environment Canada, Fisheries and Marine Service
Environment Canada, Frozen Sea Research Group
Environment Canada, Inland Waters Directorate
National Museums of Canada
Carnegie Museum of Natural History
Milwaukee Public Museum
Swiss Federal Institute of Technology
University of Alberta
University of Bristol
University of British Columbia
University of Calgary
Laurentian University
McGill University
McMaster University
University of Massachusetts
Memorial University
University of Ottawa

University of Toronto

Tubingen University, West Germany
University of Washington
University of Western Ontario
University of Wisconsin

The following is a review of 1976-77 projects carried out or assisted by the PCSP. In several cases PCSP provided logistic or field support to studies by other agencies.

Archaeology: Grinnell Peninsula, Bathurst Island

Investigator: Robert McGhee, National Museum Canada

Field work to trace the history of human occupation in the central high Arctic continued. Twelve sites were located at Porden Point representing occupations in the Independence I, Independence II, late Dorset and Thule Inuit periods; two Thule winter houses were excavated, one from each of two villages at this location. At Port Refuge, sites were mapped more adequately and a small amount of further excavation done. The central lowland of Bathurst Island was surveyed and 15 sites located which represent the same four occupation periods with the addition of a previously unsuspected 19th or early 20th century Inuit occupation. One house of the large and apparently early Thule village at Broome Point was excavated and six other sites located. PCSP provided logistics support.

Archaeology: Thule sites, Somerset Island, NWT

Investigator: Allen P. McCartney, Thule Archaeology Conservation Project, DIAND

The Thule Archaeology Conservation Project, begun in 1975, brought together archaeologists, anthropologists, climatologists, faunal analysts, zoologists, botanists and others to address the ecological adaptations and cultural adjustment of the Thule Inuit of approximately 900 AD to historic times. Activities included excavation by archaeological teams at Creswell Bay and Cape Garry; extension of 1975 air surveys to Brodeur Peninsula, northern and western Somerset Island and most of Devon Island; and a short visitation to these sites by non-archaeological specialists.

At Cape Garry three houses were selected for excavation for their variety of surface configurations. A total of 900 catalogued artifacts were removed including a full representation of Thule artifacts, basalt chopping tools, and several Dorset pieces. Organic and inorganic samples total 480 catalogue entries including approximately 10 000 faunal fragments. The site is estimated to have been occupied from approximately 1100-1300 AD. At the Creswell Bay site three houses were excavated with a

total of 798 artifacts catalogued including several amber beads, more Dorset artifacts and chert debitage, and basal chopping tools and flakes; indicating an approximate site age of 1300-1500 AD. Cape Garry was used extensively for collecting whale bone, while Creswell Bay has not been as extensively investigated by modern carvers. Plant and soil samples, taken from both sites, will be studied to determine the degree of Eskimo influence on site vegetation and soils. A whale biologist visited the Creswell site to identify and sample whale bones. PCSP provided all logistics support.

Archaeology: Thule sites, Banks Island, NWT
Investigator: Charles D. Arnold, University of Calgary

Archaeological research was conducted during the summer of 1975 to investigate the nature and extent of Thule Eskimo occupations along the south coast of Banks Island from the region of the Masik River in the east to Cape Kellett in the west; and in doing so to obtain data that might bear upon the problem of Eastern vs Western Arctic cultural interactions.

Eight sites were either newly discovered or re-investigated. In addition, numerous isolated caches and shooting blinds were located for which site designation has not been provided and for which cultural affiliations are difficult, if not impossible, to determine. Lithic artifacts (49.6 per cent of the 210 artifacts recovered from the site) were categorized into cutting/scraping activities, piercing/penetrating activities, unidentified chipped stone, tool manufacture activities, and lamps. Ivory, antler, bone and wood artifacts were categorized into hunting implements, hide working implements, art/ornamental objects, and other tools and utensils. The lagoon site assemblage (near Masik River) has been assigned a late or terminal Pre-Dorset date. PCSP provided logistics support.

Archaeology: Banks Island NWT
Investigators: H. Muller-Beck, B.R. von der Heyden and J-L Rousselot, Tübingen University

Continued ethnological and ethnohistoric studies in the Sachs Harbour area reveal that a large part of the population comes from the Mackenzie Valley Delta and a smaller part from the Copper Eskimo region. Two distinct traditions and cultures can still be observed in these two groups and by examining young archaeological data it seems possible to construct actual cultural situations. Material culture objects were collected and described for placement in a museum to be established at

Sachs Harbour. PCSP has supported this study by supply of a building in Sachs Harbour along with other support.

Biology: Zoology, vertebrate ethology and animal community study, Bathurst Island and Seymour Island

Investigator: S.D. MacDonald, National Museum of Natural Science

Research continued at the National Museum of Canada High Arctic Research Station on Bathurst Island to investigate the relationships between species of Arctic animals and the behavioural adaptations that enable them to survive in high Arctic environments. These studies include: a breeding bird census and banding program; the life history and ecology of varying lemming; meteorology and microclimatology at Bathurst and Seymour Islands; the behavioural study of muskoxen; plant ecological research in Polar Bear Pass; the breeding behaviour and phenology of jaegers and snowy owls; and the behaviour and ecology of the ivory gull. Logistics support has been provided by PCSP.

Biology: Zoology, Ornithology, seabirds, Prince Leopold Island, NWT

Investigator: D.N. Nettleship, Canadian Wildlife Service, Environment Canada

Investigations continued of the status, habitat usage, time of breeding, breeding performance and feeding ecology of five species populations (Northern Fulmar, Glaucous Gull *harrus hyperboreus*, Black-legged Kittiwake *rissa tridactyla*, Thick-billed Murre, Black Guillemot *cepphus grylle* on the cliffs of Prince Leopold Island in 1976. The long-term aim is to provide a baseline and simulation model from which estimates and predictions of population density flux, biomass changes and bio-energetic demands of resident breeding species populations, especially with reference to the breeding season, can be made. These data will assist in planning a meaningful management policy and identification of processes by which this endangered seabird resource can be protected and maintained. All logistics support is provided by PCSP.

Biology: Arctic whales, Beaufort Sea and Pond Inlet

Investigator: D.E. Sergeant, Fisheries and Marine, Environment Canada

An aerial survey of the Mackenzie Delta and Franklin Bay area taken in early July showed approximately 3 250 white whales, with more than half the animals close-outside Shallow Bay. Bad weather nullified an attempt at sonic studies of white whales at Kidluit Bay. Studies of narwhals at Pond Inlet and Arctic Bay, plus observations of the migration of sea

mammals westward in Lancaster Sound, reveal no changes in narwhal numbers (more than 6 000), but indicate an increase from three to 23 bowhead whales passing close to shore. Studies on narwhals at Pond Inlet and Arctic Bay gave new information on feeding and hunting loss rates and further information on reproduction, age and growth of narwhals.

Biology: Zoology, Arctic char, Stanwell Fletcher Lake, Somerset Island

Investigator: L. de March, Fisheries and Marine, Environment Canada

Studies were carried out to determine primary production, rates, nutrient budgets, seasonal patterns of physical and chemical variables, inter-relationships between stream macrobenthos and physical variables, life history and numbers of anadromous Arctic char and the effects of sediment addition on the biota and chemistry of a tundra pond.

Biology: Zoology, Arctic char, lake trout and cisco, Kent Peninsula, Victoria Island NWT

Investigator: J. Scott Campbell, Fisheries and Marine Service, Environment Canada

Detailed surveys on fish and invertebrate species were carried out on the Ekkaluk River from its origin in the center of Victoria Island down to Ferguson Lake. The survey was initiated in order to obtain information on the factors which affect population dynamics of Arctic char and lake trout in the lakes and rivers of the Kent Peninsula and Victoria Island.

Nets were set in 12 lakes, three per day, with retrieval on the second day. Also, test fishing observations were taken on plankton, bottom fauna, water temperatures and water chemistry. Three lakes in the Melville Sound-Elu Inlet area were also surveyed. PCSP provided helicopter support.

Biology: Marine Fisheries, Western Arctic

Investigator: J.G. Hunter, Fisheries and Marine Service, Environment Canada

Balloon trawling was conducted in Tuktoyaktuk Harbour and Kugmallit Bay in July of 1976 and in Liverpool Bay in August from the *M.V. Salvelinus*. Trawling on a random pattern in Kugmallit Bay confirmed the existence of large numbers of smelt *osmerus eperlanus* and burbot *lota lota* in the shallow plume waters. Trawling in Liverpool Bay on a grid pattern to delineate species distribution, composition and abundance, revealed that these abundant fishes occur in large itinerant schools. Logistics were provided by PCSP.

Biology: Zoology, polar bear population dynamics

Investigator: Ian Stirling, Canadian Wildlife Service, Environment Canada

Field work continued to concentrate on sea-

sonal distribution, movements of tagged bears, number of subpopulations affected, locations of maternity dens and feeding areas, and age structures of polar bears captured by researchers and of those killed by Inuit hunters, with particular attention to the possible effect of proposed pipeline channel crossings and staging areas on important denning and feeding areas and the cultural and economic value of polar bears to the Inuit hunters. These studies will be used to assess the effects of a pipeline from the High Arctic Islands to southern Canada; to determine the status of polar bear population; and to understand the marked decline in numbers, productivity and survival of young polar bears and seals in the Arctic. Seal population, productivity and distribution studies as they relate to and effect polar bear distribution and numbers continue. Three camps for long-term observations on the behaviour of free-ranging polar bears under natural, undisturbed conditions were occupied in 1976.

Biology: Zoology, grizzly bear, Richards Island and Tuktoyaktuk Peninsula
Investigator: A.M. Pearson, Canadian Wildlife Service, Environment Canada

Studies have been carried out since 1974 to capture, tag, and equip bears with radio location telemetry collars in order to obtain population, reproductive, recruitment and movement data. In 1976 information was gathered on the post-weaning movements and den site selection of two three-year-old bears. Effort continued to attempt to locate and measure dens, collect scats, remove non-functional collars from bears tagged previously and collect hunter kill data. Twenty-three den sites were located. Of 26 bears captured, 11 were equipped with radio collars and their movements monitored weekly. Only one had been untagged previously. PCSP provided aircraft support. Field work will continue in the Tuktoyaktuk area during 1977.

Biology: Zoology, Peary caribou, Melville and Prince Patrick Islands
Investigator: D.C. Thomas, Canadian Wildlife Service, Environment Canada

Ecological studies of Peary caribou continued (25 collected in 1974; 39 in 1975; 88 in 1976) concentrating on reproduction. There is a marked difference in several aspects of the herds between the Melville-Prince Patrick and Somerset-Prince of Wales areas. A larger collection from Boothia Peninsula is needed to unravel the taxonomy of the population, to further investigate the marked dietary differences, and to confirm an apparent earlier breeding season there. More data is needed

on the relationship between condition and reproduction. Although productivity on Western Queen Elizabeth Islands remains at about seven per cent, there has been no productivity for the past two years on Prince Patrick and Eglington Islands. Logistical support have been provided by PCSP.

Biology: Zoology, Wildlife habitat studies of caribou and muskoxen, Prince of Wales Island, Somerset Island and Boothia Peninsula
Investigator: Richard H. Russell, Canadian Wildlife Service, Environment Canada

Wildlife habitat studies of caribou and muskoxen continued in an effort to describe and delineate their habitats along the proposed Arctic Island Pipeline Project route and to assess the importance of the habitats to the animals. Studies on Somerset Island suggest that the Stanwell-Fletcher Lowlands is a key breeding and wintering ground for caribou and for the re-establishment of the muskoxen population. If Stanwell-Fletcher is used as a staging base, any resultant physical damage to the range could have significant impact on the well-being of the animals and consequently the Inuit. In 1977 these studies will continue along the proposed pipeline route between Spence Bay and Baker Lake, NWT. Logistics was provided by PCSP.

Biology: Zoology, Peary caribou and muskoxen, Prince of Wales Island, NWT
Investigator: F.L. Miller, Canadian Wildlife Service, Environment Canada

Flights over Prince of Wales Island, using three possible types of helicopters (those associated with the construction and maintenance of a pipeline) were made to gain insight into the problem of helicopter harassment of Peary caribou and muskoxen. Results from some 2 000 observations emphasize the different responses of these two animals. The muskoxen take a defense position either against a topographic feature such as a stream or gully bank (solitary bulls) or form a group, termed the "defence ring". Caribou tend to trot or gallop away from the harassment. Responses of individual animals and/or groups vary according to altitude levels and duration of harassment. Further studies will be conducted in 1977 using PCSP aircraft.

Biology: Zoology, ringed seal, Eastern and Western Arctic
Investigator: T.G. Smith, Fisheries and Marine Service, Environment Canada

Three different activities were carried out in 1976:

Work continued at Holman Island on the population dynamics and birth habitat of the ringed seal. Specimens were collected from

Inuit hunters and plane table mapping of the birth habitat in the ice of Prince Albert Sound began.

Surveys were made of McClintock Channel, Barrow Strait and Peel Sound to quantify the number of ringed seal birth lairs in the ice of the proposed arctic pipeline marine crossing areas.

Activity continued at Browns Harbour, Cape Parry to study the movement of ringed seals. There were a few surprising recoveries of seals, the furthest coming from eastern Siberia. PCSP provided logistics support.

Biology: Zoology, Arctic hare, Fosheim Peninsula, Ellesmere Island, NWT
Investigator: Maureen C. Gauthier, McGill University

Summer studies daily counts of Arctic hare to obtain information on seasonal change in numbers and distribution; daily observations of behaviour and habitat use, the collecting of fresh hare fecal material for later laboratory analysis of constituent plan species; the analyses of preferred hare habitats using vegetation transects and quadrat sampling to determine plant species composition, cover, biomass, and available forage; and observations of habitat use by muskoxen and caribou. Only one or two leverets were seen amongst herds of hare, and an aerial survey in the Fosheim Peninsula area revealed that hare were not abundant. PCSP provided full logistics support.

Biology: Zoology, Isopods, Herschel Island, Inuvik, NWT
Investigator: J.A. Percy, Fisheries and Marine Service, Environment Canada

Studies were carried out in three phases: on Herschel Island; at the Inuvik Research Laboratory; and at the Arctic Biological Station (Ste. Anne de Bellevue) — on the physiological responses of species comprising the Mesidotea complex *Mesidotea entomon*, *M. sibireca* and *M. sabini* to two categories of environmental stresses: natural stresses — temperature and salinity and their role in determining the distribution metabolism, reproduction and growth of the three species; and anthropogenic stresses — the sublethal physiological effects of crude oil on these animals particularly in relation to alterations in the ability to tolerate natural stresses.

Biology: Environment Impact; Nanisivik Mines, Strathcona Sound and Arvik Mine, Cornwallis Island
Investigator: B.W. Fallis, Fisheries and Marine Service, Environment Canada

Studies, begun in 1974, in the vicinity of Nanisivik Mines continued to determine the abun-

dance and species composition of aquatic biota in the waters adjacent to the development area. Samples of water sediment and selected types of biota were collected from 10 locations in Strathcona Sound for determinations of existing concentrations of heavy metals. Similar sampling was conducted at Arctic Bay to acquire control data from an area outside the immediate influence of the mine. An extensive aerial survey of marine mammal resources was conducted in the Admiralty and Navy Board Inlet areas to determine the migration patterns of narwhal, their abundance and to assess their use of Strathcona Sound. Environmental studies were conducted on Garrow Lake, Little Cornwallis Island to try to assess the impact of disposal tailings from the proposed Arvik Mine. Preliminary results reveal that this lake is meromictic with a distinct halocline at a depth of 19 m below which there is a marked increase in salinity and above which a monoclulture of *limnocalanus macrurus* resides. PCSP provided logistics support.

Botany: lichens, Mackenzie Valley, NWT

Investigator: B. Grace, University of Guelph
In an attempt to set air quality criteria for sulphur dioxide emissions in the Mackenzie Valley, lichens from various vegetation communities have been used as indicators of vegetation sensitivity. An extensive survey of terricolous macrolichens indicate that the Lower-Mackenzie Section of the Boreal Forest has the greatest surface cover of lichens and therefore is the most sensitive area to potential ecological damage caused by sulphur dioxide fumigations. Several communities of the Upper Mackenzie Section of the Boreal Forest and Tundra also have abundant cover of lichens. The sensitivity of lichens to atmospheric pollutants depends on environmental parameters such as temperature and atmospheric humidity. Computer modelling of microclimatic data from four study sites in the Mackenzie Valley (Fort Simpson, Norman Wells, Inuvik and Tuktoyaktuk) will allow prediction of time periods for which lichens would be most sensitive to atmospheric pollution. PCSP provided logistics support.

Botany: Nectaries of Arctic plants, Arctic Islands

Investigator: Dorothy E. Swales, McGill University

An impressive variety of living plants and flowers were collected on Cornwallis Islands and the islands east, west and south of Cornwallis. The nectaries, ovaries and stamens of all species were sketched, the plants pressed,

mounted and filed in the McGill Herbarium. Weather conditions made it impossible to record insect pollination. By mid-July only one variety of grass and sedge, *alopecurus alpinus*, had grown.

Botany: Burning lignite, Smoking Hills, Cape Bathurst

Investigator: T.C. Hutchinson, University of Toronto

A large sampling program of the grasses, growing in fumigated areas in the vicinity of the Smoking Hills, Cape Bathurst, and occurring in zones of heavy SO₂ fumigation and on heavy metal-contaminated, highly acidic soils, was carried out for the purpose of selecting and developing vegetation capable of growing on highly acidic tailings and mine wastes in the Yukon and NWT. Analyses to date indicated elevated levels in Smoking Hills' soils of U, V, Ba, Cd, Zn and Ni. The plumes also contained a multitude of elements in particulate form. Tolerance comparisons were made, both in the field and in the laboratory, between the biota and chemistry of small tundra ponds in the vicinity of the Cape Bathurst burns and that of control areas away from the burns. PCSP provided logistics support.

Climatology: North Water Project

Investigator: F. Muller, McGill University
During the winter of 1975-76, 600 unmanned OTT automatic weather stations were left operating in the North Water area. In the spring data were collected from the Coburg Island and Cape Herschel stations on climate, sea ice distribution and thickness and the mass balances of Laika and Leffert Glaciers. Five automatic weather stations were left to operate over a further winter (1976-77). This season accumulation rates were studied using isotopic analysis on ice cores taken from Ellesmere Island and Greenland Ice Cap. Further measurements relating to sea ice dynamics within the Northwater were taken and an investigation of the influences of local climate, soil and water supply on the vegetation of Coburg Island were carried out. Data from six automatic weather stations for the period 1972-76 have been completely analysed, as well as remote sensing data from three Northwater flights in 1975. PCSP provided logistical support with equipment and aircraft.

Climatology: Meteorology

Investigator: B. Alt, Contractor to Polar Continental Shelf Project, Department of Energy, Mines and Resources

Aviation weather reports were collected twice daily from all PCSP supported field stations in the Eastern Arctic for operational and climatological use during the 1976 field season. A

study of the relationship between mass balance and climate on the Devon Island ice cap, using data collected by various investigators over the past 15 years, revealed three basic synoptic types whose frequencies explain the very negative and very positive balance years. The weather behind the unusually warm summers of 1969 and 1962 was examined; the 1969 circulation appears to have given very local summer conditions to Devon Island ice cap, whereas 1962 was a summer of very negative mass balances over all the Queen Elizabeth Islands' ice caps.

Geology: Stratigraphy, Mesozoic, Western Queen Elizabeth Islands, District of Franklin

Investigator: H.R. Balkwill, Institute of Sedimentary and Petroleum Geology, Geological Survey of Canada, Department of Energy, Mines and Resources

Mapping was completed on Lougheed and Mackenzie King Islands, and at Sabine Peninsula, and small areas of the Ringnes Islands and northwestern Melville Island were examined. Bad weather prevented completion of mapping on Borden and Brock Islands.

Exposed bedrock structure on Lougheed Island comprises a conformable succession of Lower and Upper Cretaceous strata, including the Isachsen, Christopher, Hassel, Kanguk and Eureka Sound Formations, of the Sverdrup Basin Mesozoic succession. The island is underlain mainly by Tertiary strata. The Cretaceous formations are arranged about a shallow, south-eastward-plunging syncline (Lougheed Syncline). The south-western flank of the syncline is interrupted locally by complex, disharmonic, flexural-flow folds, with northward-directed asymmetry. The structural style indicates the presence of a structurally high domain offshore from the south-western and south coast of Lougheed Island. PCSP provided full logistics support to this project.

Geology: Stratigraphy, Operation Boothia, Somerset Island and Boothia Peninsula, District of Franklin

Investigator: J. Wm. Kerr, Institute of Sedimentary and Petroleum Geology, Geological Survey of Canada, Department of Energy, Mines and Resources

Operation Boothia is a project of the Geological Survey of Canada initiated for the purpose of studying the various aspects of bedrock geology of Boothia Peninsula and Somerset Island, NWT. One objective is to produce a comprehensive geological report that covers all aspects of the bedrock geology of the project area to provide essential information for evaluation of a proposed natural gas pipeline route, and for the discovery and eval-

uation of potential resources. In 1975 mapping of the northern half of Somerset Island was completed, and in 1976 mapping of the southern half of Somerset Island was completed along with the northern half of Boothia Peninsula. PCSP provided logistics support.

Geology: Stratigraphy and sedimentation, upper Proterozoic, Melville Hills, NWT

Investigator: G.M. Young, University of Western Ontario

Studies in two areas of the Brock Inlier confirmed the proposed assignation of these rocks to the Shaler Group of Victoria Island. Various rock designations can be matched closely with: units of the Glenelg Formation of Victoria Island; the lowest Proterozoic unit exposed on Banks Island; the thick sandstone dominated unit of Banks Island and of the upper Glenelg Formation in the northwest part of the Minto Arch of Victoria Island; the characteristic orange-weathering stromatolitic unit that caps the Glenelg Formation; and the lower part of the Reynolds Point Formation of the Shaler Group. PCSP provided aircraft support.

Geology: Stratigraphy, Silurian, Baillie-Hamilton and Cornwallis Islands

Investigator: B.D.E. Chatterton et al University of Alberta

The following samples were collected: silicified invertebrate fauna (primarily brachiopods and trilobites) along the south coast of Baillie-Hamilton Island; horizons from strata of the Cape Phillips Formation along with graptolite and conodont samples; samples containing silicified and unsilicified brachiopods and trilobites from the Cape Phillips Formation; and trilobites (silicified and calcareous) from the Read Bay Formation at Goodsir Creek. The Geological Survey of Canada provided locality numbers before the collected samples were shipped to the universities of Alberta, Western Ontario and Calgary for further processing and study of the invertebrate faunas. PCSP provided logistics support.

Geology: Stratigraphy, Upper Silurian, Somerset, Cornwallis and Little Cornwallis Islands

Investigator: J. Veizer, University of Ottawa

Samples from the Leopold Formation and from the Read Bay Formation will be examined geochemically, using trace elements, to interpret their diagnostic history and economic potential. A study of the stratigraphy and paleoecology of Upper Silurian rocks along the southeast coast of Somerset Island revealed: the upper part of the intertidal-supratidal Leopold Formation to be a lateral facies equivalent of the subtidal Read Bay Formation; the presence of two zones of biothermal (reefoid)

development; depth variations during the Read Bay deposition can be inferred from the succession of rock-types and fossils; and an evaluation of the regional setting of the Somerset Island sequence by examining the Upper Silurian formations on Cornwallis Island. Analyses of sediments from the Peel Sound Formation, Somerset Island and adjacent islands concluded that marginal marine and non-marine sedimentation of Silurian-Devonian age over a wide area of the South-Central Arctic Islands was a reflection of the emerging Boothia Uplift. Read Bay Formation to Peel Sound Formation strata across the area can now be tentatively correlated and regional patterns of sedimentation interpreted. PCSP provided logistics support.

Geology: Geomorphology, King Christian and Southern Ellef Ringnes Islands, District of Franklin

Investigator: D.A. Hodgson, Geological Survey of Canada, Department of Energy, Mines and Resources

Studies of basic data necessary for land management were instigated by discoveries of natural gas at a number of sites on King Christian Island and both onshore and offshore of southwest Ellef Ringnes Island. Descriptions of dominant material-genetic units and landforms together with observations on active geomorphological processes form the basis for discussions of the susceptibility of the terrain to man-induced disturbance. Some observations on the Quaternary history are reported. Field observations were made of: landforms, materials, processes, and vegetation at surface sites, with pits being dug to the frost table; stratigraphy, and particularly ice content of cores obtained by drilling to a maximum 2.5 m depth; and natural stream cuts. Aircraft support was provided by PCSP.

Geology: Geomorphology, Banks and Victoria Islands, District of Franklin, NWT

Investigator: H.M. French, Geological Survey of Canada, Department of Energy, Mines and Resources

Field work of a stratigraphic nature continued in the investigation of pingos and pingo-like features and the mass displacement structures in the active layer in parts of southwest Banks Island. From C-14 dates, on willow, it is possible to calculate maximum age for the growth of the features and the age of cessation of pingo growth. Samples of sub-surface organic material will be C-14 dated and may indicate whether these structures are currently forming or are relict features related to a period of greater seasonal thaw and possibly cryoturbation activity.

Studies at Holman on Victoria Island concentrated on: permafrost conditions in and around the townsite; raised beaches and Late Quaternary Chronology; and current geomorphic processes, notably frost shattering and solifluction. Ice rich permafrost is rare or absent in the vicinity of Holman. The maximum marine limit is thought to be at least 70 m. Marine shells collected inland along the Ukkpik River at an elevation of 18.3 m will provide information upon rates of postglacial isostatic uplift. PCSP provided logistics support.

Geology: Geomorphology, coastal process studies, Barrow Strait, NWT

Investigator: R.B. Taylor, Geological Survey of Canada, Department of Energy, Mines and Resources

Field investigations in 1976 ended a three year study of seasonal beach profile change and nearshore characteristics and coastal processes. Repeated resurveying of beach profiles to document shoreline stability has produced a quantitative analysis of shoreline change over two and six seasons respectively. Beach profile change on Lowther and Bathurst Islands was minimal, while an initial examination of beach profiles on Somerset and Devon Islands indicates much greater changes, although detailed calculations have not been completed. The estuarine study of Cunningham Inlet and the study of diurnal ground temperature fluctuations across an active beach continued from a base camp on Cunningham Inlet and two fly camps on Bathurst and Devon Islands. Logistics support was provided by PCSP.

Geology: Geomorphology, Mackenzie Valley and Delta, NWT

Investigator: J.R. Mackay, University of British Columbia

Field studies continued in the Tuktoyaktuk Peninsula, Garry Island, Richards Island, Hooper Island and Inuvik areas on the genesis of permafrost, with specific reference to ground ice and patterned ground. Subpermafrost pore water pressure measurements, studied by artificially inducing artesian flow and installing pressure transducers beneath aggrading permafrost, show that subpermafrost pore water pressures, from pore water expulsion, can approach the total overburden (lithostatic) pressure. Attempts to measure freezing potentials beneath aggrading permafrost and in the active layer, during the freeze-back period, reveal evidence to suggest creep in two large pingos and also in the pingo ice tunnel, at Tuktoyaktuk, which was excavated some 10 years ago. Tests to monitor heave in mud hummocks, show that

some mud hummocks crack before the active layer is completely frozen. Measurements are being conducted on the heave of fine grained mud hummocks at negative temperatures within the hummocks. PCSP provided logistics support.

Geology: Geomorphology, Alluvium, Terrain disturbance, Banks and Melville Islands

Investigator: H.M. French, University of Ottawa
 Eight terrain disturbance sites on Banks Island were visited this past summer. At Ballast Brook and Big River, long-term observations upon thermokarst and vehicle disturbances are being undertaken. Other sites were visited for routine observation and inspection of terrain restoration practices and sump infilling. The major component of summer fieldwork was terrain sensitivity mapping on Eastern Melville Island, and a survey of wellsumps both in the High Arctic Islands and the Mackenzie Delta. PCSP provided aircraft support to this DIAND contract.

Geology: Past glacial activity: Eastern Judge Daly Promontory, Northeastern Ellesmere Island

Investigators: J. England, University of Alberta; R.S. Bradley, University of Massachusetts
 Field work continued on the former interaction of the Ellesmere Island and Greenland ice sheets by: the recollection of marine shells associated with a prominent ice shelf moraine deposited by the outermost northeastern Ellesmere Island ice advance; the coring of peat-like peat deposits in a spill-way incised by the former advance of the Greenland Ice Sheet onto Ellesmere Island (Sampling below 60 cm was impractical, but some samples were taken for ^{14}C dating at the 15 cm layer); the recollection of ice-transported shells in a Greenland moraine at the easternmost end of this spillway immediately above the western shore of Kennedy Channel; and the additional mapping of the glacial deposits from both the Ellesmere Island and Greenland ice sheets in this coastal area. Elevation and stratigraphy were observed at the Pavy River delta and a collection of *in situ* marine shells was made. Of particular importance was additional work on the ice-contrast, Cape Baird terrace that extends around Cape Baird, from Lady Franklin Bay, and into the lower Pavy River valley. PCSP provided logistics support.

Geology: Paleontology, Ellesmere Island

Investigators: Dr. Robert M. West, Milwaukee Public Museum, Dr. Mary R. Dawson, Carnegie Museum of Natural History
 A substantial collection of vertebrate fossils was collected from a series of localities in the Eureka Sound Formation near Strathcona

Fiord, Ellesmere Island. Included in the continental vertebrates found were fishes, salamanders, lizards, a snake, several turtles and alligators. Three presumed bird bones were collected and the remains of perhaps 20 species of mammals. These vertebrates are apparently representative of a warm temperate climate, and show an assemblage far more diverse than lives in the same region today. This particular assemblage apparently lived just prior to the breakup of a common Euro-American faunal realm in the early Eocene. These results confirm the environmental suitability of the Paleogene far north for a diverse vertebrate assemblage. Logistics support was provided by PCSP.

Geology and Geophysics: marine, CSS Hudson Arctic Cruise Phase II, Lancaster Sound and area, NWT

Investigator: Brian D. Bornhold, Geological Survey of Canada, Department of Energy, Mines and Resources

Investigations focussed on the surficial sediment distribution processes, the Quaternary history of sedimentation, the acoustic and mass physical properties of surficial materials, bedrock structures linking and dividing the Arctic Islands, and the subsea thermal region. Various geophysical and geological tools and techniques were used. PCSP provided expediting and other logistics support.

Geophysics: Electromagnetic sounding of ice and permafrost, Tuktoyaktuk, NWT

Investigator: James R. Rossiter, University of Toronto

To complete and compare work started in August, 1974, three experiments were conducted near Tuktoyaktuk: radio frequency interferometry, at the Involved Hill Test Site, and over sea and lake ice; audio magnetotellurics at the Involved Hill and over the Beaufort Sea; and *in situ* probe measurements of the dielectric properties of frozen soil at the Involved Hill. From preliminary results, all three experiments give the following consistent interpretation: a very moist active layer, about 50 cm thick, with a conductivity-thickness product of less than 0.03 mhos is on the surface in summer; the active layer freezes in winter and has electrical properties similar, but not identical, to the underlying material; the clay till permafrost near the Involved Hill has a dielectric constant of about 6-7, a loss tangent (at 16 MHz) of about 0.15, and therefore a conductivity of about 10^{-4} mhos/m. Work was conducted out of PCSP base camp at Tuktoyaktuk.

Geophysics: Geomagnetic depth sounding, Banks and Victoria Islands

Investigator: R.D. Kurtz, Earth Physics Branch, Department of Energy, Mines and Resources

In the spring of 1976, 11 three-component fluxgate magnetometers were operated simultaneously on a 500 km line extending from north-central Banks Island to south-central Victoria Island. The data were digitally recorded at one minute intervals. PCSP provided full logistics and transportation in this area. This project was a continuation of the 1974 profile which extended out to 270 km over the continental margin of the Arctic Ocean. The present work was designed to further study the Mould Bay induction anomaly, to locate its eastern boundary, and to examine the inductive response of Victoria Island, in particular the Precambrian Minto Arch.

Geophysics: Geothermal measurements

Investigator: A.S. Judge, Earth Physics Branch, Department of Energy, Mines and Resources

During 1976 eight new permafrost thickness determinations based on deep temperature measurements in northern drillholes were made in the Mackenzie Delta. Numerical models have been developed to determine the physical parameters of the surrounding formation and gas hydrates are being investigated with current emphasis on prediction and detection. Combined seismic and thermal studies of permafrost and hydrates beneath the Beaufort Sea continue to map a distribution pattern relating closely to the combined history of water and ice-cover. Shallow thermal studies of the near-surface regime continue in the Beaufort Sea and in the Arctic channels. Permafrost distribution studies at Arctic shorelines in the vicinity of Byam Martin and Little Cornwallis Islands, and measurements of ground temperatures in eastern Melville Island have been in support of the Arctic pipeline appraisal. Routine measurements of thermal properties of frozen and unfrozen soils and rocks have continued. All data is being analysed in hopes of finding universal models connecting thermal and other physical properties. PCSP has provided full logistics support.

Geophysics: Gravity, Beaufort Sea and Amundsen Gulf

Investigator: D.B. Hearty, Earth Physics Branch, Department of Energy, Mines and Resources

The purpose of the survey was to complete the regional gravity coverage in the Beaufort Sea and Amundsen Gulf areas and to re-evaluate data from check points provided for surface meter work especially in ship turn-

around areas along the coast. A traverse line of 30 stations west of 127° was run to check gravity and bathymetry of the 1971 survey data. A total of 713 stations were observed during the two-part survey in March and April, 1976 and one additional gravity station was established at Norway Island. Two Lacoste and Romberg gravimeters were used for the regional measurements and two Edo 9040 acoustic depth sounders were used to collect bathymetric data in meters at each gravity station. The PCSP Decca Lambda Chain was used for navigation. PCSP provided all logistics and air support for the program.

Geophysics: Impulse radar in permafrost, various sites, NWT

Investigators: A.P. Annan and J.L. Davis, Geological Survey of Canada, Department of Energy, Mines and Resources

In spring 1976, experimental studies using radar sounding and time-domain reflectometry (TDR) were carried out around Inuvik, Tuktoyaktuk, Rae Point, Norman Wells, NWT and Dawson City, YT to delineate the extent of buried massive ice bodies. TDR is best suited to monitor electrical properties while the radar is most gainfully employed in mapping surficial geological structures. Surveys included such varying terrain as the ice road at Tuktoyaktuk, two thermally insulated sections of the Mackenzie Highway south of Inuvik, the proposed highway route from Inuvik to Tuktoyaktuk, the GSC Involute Hill test site, the Tuktoyaktuk runway, the Norman Wells runway, an eight-mile section of the proposed Mackenzie Highway route. Ice thickness and water depth were measured across two ice bridges spanning the Mackenzie River. Also, extensive surveys were carried out on the Consett River, and the Frustration River north of Rae Point. It was concluded: 1) radar can be used to map lithology in coarse-grained soils; interfaces at depths exceeding 30 m have been mapped; 2) fine-grained soils exhibit significantly higher electrical loss; in clay covered areas, penetration of radar signals was less than 3 m; 3) ice thickness on fresh water lakes and rivers can be mapped quickly and routinely; 4) water depths of shallow lakes and rivers can be mapped from an ice covered surface; river and lake bottoms have been mapped to depths of 7 m; 5) the electromagnetic wave velocities of frozen soil and ice are so similar that ice content cannot be inferred from velocity measurements alone. PCSP provided all logistics support.

Geophysics: Seismology, seismic properties of permafrost

Investigator: J.A.M. Hunter, Geological Survey of Canada, Department of Energy, Mines and Resources

Research on the seismic properties of ice-bonded permafrost continued in both the eastern and western Arctic. Borehole velocity measurements were made at Kay Point, YT; GSC Test Site, Tuktoyaktuk Peninsula; and Rae Point, Melville Island. Compressional and shear wave velocity measurements were made in conjunction with related density, porosity, temperature and geological logs.

Studies of sub-seabottom permafrost continued in the Beaufort Sea. During a spring program on the shore-fast ice, sub-seabottom temperature gradients were observed and sediment samples were taken at five sites as far as 30 km offshore.

Geophysics: Sonic logging, Devon Island Ice Cap

Investigator: C.R. Bentley, University of Wisconsin

Sonic velocity measurements were carried out in the 1971 and 1972 drill holes to the base of the Devon Ice Cap. Only a short section, between depths of 151 m and 178 m could be logged in Hole 71 whereas a depth range of 80 m and 270 m in Hole 72 was successfully logged. A completely unexpected result was that at depths greater than 210 m, velocities decreased rapidly downward. Furthermore, velocities were less with a short receiver spacing than with a long receiver spacing, and most velocities were substantially less than would be expected in solid ice of any fabric. Densities calculated using a standard relationship between velocity and density do not agree at all well with those measured, indicating that there are decompression effects which have changed the densities in the core relative to those *in situ*.

Geophysics: Portable satellite receiving station

Investigator: S. Wahkurak, Geological Survey of Canada, Department of Energy, Mines and Resources

The Geological Survey of Canada in co-operation with the PCSP have developed a portable meteorological satellite receiver. During 1976 receiver stations were operated at Lynn Lake, Manitoba, and at Resolute Bay, NWT. The station at Lynn Lake provided satellite imagery in support of the airborne gamma-ray spectrometry survey in northern Manitoba. The stretched infrared Visible/Infrared Spin Scan Radiometer (VISSR) data from geostationary satellite provided a coarse but timely (every half-hour) view of weather conditions affecting the survey area and complemented

the more detailed imagery received from the Polar orbiting satellite (NOAA). At Resolute Bay only data from the NOAA satellite was received. The images were used by PCSP to co-ordinate airborne support of scientific parties working in the Arctic Islands and by the weather office as an adjunct to the isobaric and forecast maps.

Glacier physics: Glacier physics, Devon, Axel Heiberg, Meighen and Ellesmere Islands' Ice Caps

Investigators: R.M. Koerner, and W.S.B. Paterson, Polar Continental Shelf Project, Department of Energy, Mines and Resources

In May and June 1976 radio echo soundings were taken on Devon Island ice cap, Central Ellesmere Island ice cap (together with transects down Cadogan Glacier), Mer de Glace Agassiz in Northern Ellesmere Island and the main ice cap of Axel Heiberg Island in search of a borehole site to be drilled in the spring of 1977. Low-order accuracy mass balance networks were set up across the Central Ellesmere ice cap and down the east side of the Axel Heiberg ice cap to provide background data for any future boreholes; the mass balance of Devon Island ice cap and Meighen Ice Cap were measured. Final sets of inclinometer measurements were made in the 1971 and 1972 boreholes on the Devon Island ice cap. In addition, gravity ties were repeated between the borehole site and Resolute Bay first made in 1971.

Glacier physics: Radio Echo Sounding, Devon Island Ice Cap, NWT

Investigator: M.E.R. Walford, Bristol University, England

Measurements of the amplitude and phase of radio echoes returned from the bed of the Devon Island ice cap were carried out successfully in the vicinity of a borehole located near the crest of the ice cap with new Phase-Sensitive Radio Echo Sounding equipment. Careful impedance-matching, calibration and other ancillary measurements essential to proper interpretation of the results were made and the sites were carefully surveyed both by radio echo sounder and theodolite. Various markers were buried in the snow to enable a second visit to be made to the same sites which will yield information about rate of movement and of thickening or thinning of the ice cap. The new observation was made that radio echoes from the bed contain many dislocations of the type previously observed in pulsed wave trains in the laboratory. It was also noted that one can detect echoes using a receiving antenna oriented at right angles to

the transmitting antenna. PCSP provided all logistics support out of Resolute.

Glaciology: Climatology, Axel Heiberg Island
Investigator: F. Muller, Swiss Federal Institute of Technology, and McGill University

Two englacial temperature measurements were taken at three glacier bed sites in the ablation area of White Glacier using an open system hot-water drill. Three further sites will be drilled to complete sampling of the whole glacier. Work continued on the mass balance measurements of White and Baby Glaciers with stake readings and a resurvey of the stake network. A compilation of data from White Glacier will be published in 1977. A study of distribution and melting of the snow cover of the tundra was carried out. Regular surface weather observations were taken four times daily at the Axel Heiberg base camp from early May through August. All logistics support was provided by PCSP.

Hydrography: Hydrographic surveys, Belcher Channel and Penny Strait

Investigator: E.F. Thompson, Canadian Hydrographic Service, Environment Canada

A bathymetric survey of Belcher Channel and Northern Penny Strait was conducted in the spring 1976. In conjunction with this program, closely spaced soundings were taken (using an EDO 9040 sounder) in a corridor through Belcher Channel and along two proposed pipeline crossings (one between Grinnell Peninsula and Cornwall Island, and one between Bathurst Island and Grinnell Peninsula). In total, 8705 spot soundings were taken. Three Aanderaa tide gauges were installed over the sounding area (Pelham Bay, Cape Butler, and 3.2 km south of Belcher Bay). Current studies were carried out in Belcher Channel and Penny Strait and, in addition to regular survey operations, successful field tests were carried out using a Bombardier BOMBI as a vehicle to deploy through-the-ice continuous sounding instruments. PCSP provided aircraft and logistics support.

Hydrography: Artificial Islands, Beaufort Sea, NWT

Investigator: H.W. Pulkkinen, Polar Continental Shelf Project, Energy, Mines and Resources, seconded from Marine Sciences Directorate, Environment Canada

In 1976, the Canadian Hydrographic Service initiated a study by aerial photographic methods of 17 artificial islands built by oil companies in the Beaufort Sea to monitor the construction and, more specifically, the ongoing status of these islands after they are abandoned. This information is required for navigational charts of the area as these islands

are potentially hazardous to navigation. Vertical aerial photographs of the islands were taken on July 15th, shortly after ice break-up, and a set of hand-held photographs were taken on September 28th, shortly before freeze-up. One island disappeared between July and September and two more are showing signs of rapid disintegration. Two similar flights are planned for the 1977 season. PCSP provided photographic and aircraft support.

Hydrography: Tidal and current surveys, Amundsen Gulf, Mackenzie Delta, NWT
Investigators: F.E. Stephenson and R. Wills, Fisheries and Marine Service, Environment Canada

Hydrographic surveys continued of the Athabasca-Mackenzie Waterway using the Radium Express. A survey of Hay River was completed, extending the sounding coverage upstream to the new townsite. An annual review survey of the Mackenzie River from Tuk to km 0 was conducted. In the Western Arctic, surveys continued of Mackenzie Bay. A survey of the shipping route through Eskimo Lakes from Liverpool Bay to Hans Bay revealed that an acceptable route does exist throughout the lakes, but that several aids to navigation may have to be installed in the narrows to assist large barges to Hans Bay.

Water level gauges were placed at Camp Farewell, Tununuk Point and at Mile 1056 in the East Channel of the Athabasca-Mackenzie Waterway to establish low water datums for a large portion of the Delta. Similarly, in the Western Arctic gauges were installed at Baillie Island, PCSP Base Camp at Tuk, Garry Island and at Kay Point to monitor storm surges and to obtain knowledge on the interaction between the Mackenzie River discharge and the tidal forces. Four water level gauges were operated between Liverpool Bay and Hans Bay. Two Aanderaa (underwater) pressure gauges were installed at Tuktoyaktuk, Cape Parry and Cambridge Bay to record atmospheric pressure, and three of these gauges were installed at Rabbit Island and Misik River on Banks Island and at Cape Young in Dolphin and Union Strait. Surveys proposed for Amundsen Gulf were cancelled due to ice damage sustained by CSS Parizeau. Aircraft support was provided by PCSP.

Hydrology: Hydrometeorology and Water Balance of a small Arctic Basin, Cornwallis Island, NWT

Investigator: Philip Marsh, McMaster University

Hydrologic studies were carried out in a 35

km² drainage basin near Resolute Bay to accurately determine the snow storage and rainfall in the basin, hence to assess the accuracy of applying the AES precipitation data to nearby small basins and to study the effect of various hydrologic processes on the transfer of water from rainfall and snowmelt to stream discharge; initial results indicate that AES data from Resolute underestimates basin snow storage by 200 per cent while rainfall showed a great variability within the basin. Steamflow records confirm the importance of a variable source area in explaining some variation in discharge during the snowmelt period. A preliminary analysis of the water balance of the basin and subbasins indicates the importance of evaporation and suggests a large spatial variation in evaporation due to variations in terrain type. All studies were conducted from PCSP base camp at Resolute.

Hydrology: Mackenzie Valley

Investigators: J.C. Anderson and J.N. Jasper, Inland Waters Directorate, Environment Canada

Studies continued to provide hydrologic information from the construction of highways in the Mackenzie Valley. Data were collected and analysed for peak discharge, channel velocity and precipitation at or near selected river crossing points on proposed or present highway routes. Peak discharge data collected at Stanley, Ryan and Hans Creeks was analysed and compared with 1975 findings. Additional observations were made on snow cover and river icings. Values of suspended sediment concentration in 1976 were similar to those of 1975. Support was provided by PCSP.

Hydrology: Permafrost temperatures

Investigator: Anthony Wankiewicz, Inland Waters Directorate, Environment Canada

Arctic rivers which flow for only a few months in the summer exert little influence on the thermal regime of their associated stream beds and snowdrifts induced by river channel morphology and orientation locally insulate the riverbed from the extremes of winter cold.

Limnology: Limnology, Inuvik, Cape Parry and Resolute Bay, NWT

Investigator: W.A. Adams, Inland Waters Directorate, Environment Canada

Solar radiation lake-ice interaction studies were undertaken on several experimental lakes in the Inuvik and Mackenzie Delta areas for which considerable background chemical and biological water quality data had been accumulated. Light penetration measurements were obtained during the crucial late spring

period of intense phytoplankton activity in the lakes.

A survey of light penetration and chemical and biological water quality was made on lake ice on Nelson Lake, Char Lake, and Merritt Lake, Cornwallis Island. PCSP provided aircraft support.

Oceanography: Oceanography, Beaufort Sea and Canadian Arctic Islands

Investigator: R.H. Herlineaux, Arctic Marine Science, Environment Canada

Seven studies were carried out in 1976 in the Beaufort Sea and Canadian Arctic Islands as follows: winter oceanographic, meteorological, ice movement and reconnaissance of the shear zone of the southern Beaufort Sea; wave climate studies off Kugmallit Bay, Pullen Island, Garry Island, Warren Point, and Cammar Drill rig; ice movement studies, using NOAA and Landsat satellite imagery and focussing on the Arctic Archipelago and peripheral area of the Beaufort Sea, identified patterns of timing of open water formation; ice movements by radar tracking in Byam Martin and Austin Channels from Byam Martin Island; ice porosity studies in summer multi-year ice to provide an insight into ice porosity when oil blowouts occur and oil is introduced under the ice; a review of compiled data on oceanography of the Arctic Archipelago; wildlife habitats and populations vulnerability to oil pollution have been investigated. PCSP supplied aircraft and logistics support.

Oceanography: Oceanography, Penny Strait
Investigator: G. Stephen Peck, Ocean and Aquatic Sciences, Environment Canada

In April, 1976 a transect from Cape Sir John Franklin (Grinnell Peninsula) to Cape Kitson (Bathurst Island) was surveyed to examine near-surface currents and related physical parameters to determine geostrophic transport through Penny Strait. A date report of near-surface currents, sigma data temperature salinity profiles and time-series current meter records will be available early in 1977. Ice thickness varied considerably across the transect. All logistics support was provided by PCSP.

Oceanography: Oceanography, Byam and Austin channels

Investigator: E.L. Lewis, Frozen Sea Research Group, Environment Canada

During April and early May, 20 recording current meters were deployed in Byam and Austin Channels. The meters were located on the sea floor and just beneath the sea ice. These positions were designed to provide information relevant to a proposed gas pipeline and the surface transport of pollutants beneath

sea ice. Data were transmitted acoustically from the sea floor to the surface where, together with data from the subsurface meters, it was transmitted to a remote data recording system on Byam Island. The subsurface current meters were recovered in July with the recovery of the bottom meters planned for February, 1977. PCSP provided logistics support during the meter recovery.

Oceanography: Oceanography, d'Iberville and Greely Fiords

Investigator: R.A. Lake, Frozen Sea Research Group, Environment Canada

The continuing study of physical oceanography in d'Iberville Fiord was carried out during March with emphasis on water structure and its modification by floating glacial ice. Measurements of sea ice bending adjacent to an iceberg were taken to determine the rate of melt of submerged glacial ice. This study was a joint project with the Glaciological Section on the Inland Waters Directorate. A study designed to determine spatial aspects of brine drainage event in and just beneath the sea ice was carried out. A tracked vehicle train consisting of two vehicles and two sleighs traversed from Greely Base in d'Iberville Fiord westward down the length of Greely Fiord and then south down Eureka Sound to Eureka. Ten oceanographic stations were completed during this traverse. Aircraft and logistic support was provided by PCSP.

Oceanography: Marine Geophysics and Geology, Eastern Arctic

Investigator: R.K.H. Falconer, Atlantic Geoscience Centre, Geological Survey of Canada, Energy Mines and Resources

In 1976, marine geoscience research was carried out in the eastern Arctic from CSS *Hudson* in order to: study the margins of Baffin Bay with geophysical techniques; extend earlier studies of the crustal structure of central Baffin Bay; and to obtain bedrock geology data on the southeast Baffin Island shelf. Some diapiric-like structures were observed on traverses off Greenland, but elsewhere structure is relatively regular. A thick sedimentary basin in Home Bay was surveyed. Sidescan sonar surveys revealed differences in the amount of iceberg scour between areas of the Labrador, Baffin Island, west and northwest Greenland shelves. More magnetic and gravity lineations were identified in Central Baffin Bay with magnetic diurnal control from a moored buoy magnetometer. High quality seismic reflection data and eight sonobuoy refraction lines provided good sediment and crustal velocity. Two chemical

oceanographical sections and some geophysical data were acquired in Lancaster Sound.

Photography: aerial, Mackenzie River and Eastern Arctic

Investigator: K.C. Arnold, et al Inland Waters Directorate, Environment Canada

Aerial photography was acquired to study hydrological and geomorphological conditions associated with proposed engineering projects along the Mackenzie Valley and along the route of the Eastern Arctic Pipeline; to undertake basic research into mechanical aspects of ice-jamming in the Mackenzie River; to study river characteristics during maximum ice/water discharge; to support a radiation study and a basin study; to study the artificial islands in the Mackenzie Delta; to study two ice caps near Grise Fiord, a hydrological basin near King Point, Melville Island, and several historic sites. PCSP supplied aircraft support.

Sea ice: Aerial surveys, Arctic Archipelago and Arctic Ocean

Investigator: D.G. Lindsay, Contractor to the Polar Continental Shelf Project, Department of Energy, Mines and Resources

The systematic airborne sea ice reconnaissance surveys conducted by PCSP from April to October, 1976 marked the 16th consecutive year for this program. Observations of the sea ice conditions were made in the channels of the Arctic Archipelago between Alert and Tuktoyaktuk and from Baffin Bay to the Arctic Ocean eight times during the season. The majority of the surveys were concentrated in Parry Channel and the Queen Elizabeth Islands. A publication *Sea Ice Atlas of Arctic Canada, 1961-1968* (M78-4/1975) is being sold by government bookstores. A second atlas of 1969-1974 sea ice conditions will be available in early 1977.

Sea ice: Dynamics of first year ice, Mackenzie Delta area

Investigator: P.F. Cooper, Jr, PCSP, Energy Mines and Resources

One strain gauge was installed near Pauline Cove, Herschel Island. Observations over a 7 1/2 month period indicated total strains varying between 1.0×10^{-3} and 1.9×10^{-3} . A steady contraction of the ice is likely caused by recrystallization and resulting contraction due to loss of brine.

Strain gauge data collected on the open ocean at 60° angular intervals showed steady anisotropic contraction. Equipment improvements are in progress to enable more accurate strain rate measurements on the ocean. (Small-scale changes in these mea-

surements were noted even within a two-day period.

Measurements of 3 km long strain line, laid parallel to the shore, showed contractions of varying degrees (according to scale used) at each station along the line and indicate that the scale over which these strains can be observed may vary from year to year.

Support was also provided for:

- an investigation of the Engigstciak archeological site near the mouth of the Firth River, YT;
- a representative collection of small mammals (shrews) from the Mackenzie Delta;
- a study of the effects of crude oil spills on tundra vegetation near Tuktoyaktuk;
- a study of the movement of cadmium through a tundra ecosystem;
- plant community and plant production studies on Cornwallis, Bathurst, Prince of Wales, Somerset and Devon islands;
- geodetic control by Doppler Satellite positioning methods;
- stratigraphic studies of Late Palaeozoic through Tertiary Formations in the northern Richardson Mountains;
- detailed stratigraphic, studies and regional mapping of Lower Palaeozoic Formations on Cornwallis and Devon Islands;
- a study of seismic techniques in difficult ice-covered offshore areas in the Beaufort Sea;
- solar radiation attenuation studies near Inuvik;
- an intensive hydrologic site investigation on a small catchment near Graham Moore Bay, Bathurst Island;
- atmospheric and sea water field tests on structural steels confirming low but significant corrosion rates; and
- historical research for a biography of Sir Edward Belcher.

copters under charter from Klondike Helicopters and three fixed-wing chartered from Bradley Air Services will be flown in support of those 115 projects. In addition to the main base camps at Tuktoyaktuk and Resolute, smaller camps will be maintained at Winter Harbour, Sachs Harbour, Baffin Island, Alert, Stephanson Island, Cape Parry, Point Bering and Bathurst Island.

Plans for 1977-78

The largest single task of PCSP will be the Eastern Arctic Island Pipeline Program out of Resolute to the south, in general on Somerset Island and the Boothia Peninsula and extending as far south as Baker Lake. The Decca Navigation Chain will be located in Viscount Melville Sound in March-April-May to support the gravity-hydrographic-oceanographic program in that area. During the summer navigational season, the vessel Parizeau will operate in Amundsen Gulf with the assistance of PCSP Decca Navigation system. An estimated 115 projects involving more than 400 people will be supported in 1977 through base camps at Tuk and Resolute. Six heli-

Department of External Affairs (EA)

The Department of External Affairs is concerned with activities in the North conducted on behalf of or in co-operation with foreign governments or their agencies. A member of the Advisory Committee on Northern Development (ACND) and several of its committees, the department provides advice on matters having foreign policy implications, maintains a co-ordination and operational role in matters of international law and policy relating to the Arctic and has responsibility for the negotiation of agreements with other countries as a result of activities or proposed activities in the North.

Within the Department of External Affairs, a number of divisions handle different aspects of its interests in Arctic matters.

The Transport, Communications and Energy Division (ECT) co-ordinates departmental responsibilities in a wide variety of areas including the international policy aspects of northern pipelines; Arctic shipping; and co-ordination of information gathering on world-wide Arctic transportation technology. Recent areas of activity include the monitoring of the procedural and political developments in the USA as regards the possible construction of a northern gas pipeline, and the negotiation of a *Transit Pipeline Agreement*, which was signed by representatives of the two governments on January 28, 1977.

Science, Environment and Transportation Policy Division (EBS) seeks to co-ordinate Canadian policy on scientific activities of foreign governments or their agencies in the Canadian Arctic and provides advice to the ACND Committee on Science and Technology on the international policy aspects of scientific conferences, exchanges and agreements. This division acts as a focal point for interdepartmental consideration of requests by foreign agencies to conduct scientific activities in the Canadian North. It also co-ordinates departmental responsibilities on transportation issues such as policy aspects of northern pipelines and Arctic shipping.

Commercial and General Economic Policy Division (ECB) follows closely foreign economic interests in the North. Of particular interest are potential investments in and extraction of northern minerals by foreign interests, and the compatibility of such projects with our domestic and foreign policy objectives.

The Legal Operations Division (FLO) is responsible for international legal aspects of the Arctic and for ensuring that activities and programs relating to the Arctic are consistent with existing and evolving principles of international law. For example, FLO oversees the

application of Canada's rights and duties as contained in the 1958 Convention on the Continental Shelf. In consultation with departments and agencies having specific responsibility for surveillance of coastal waters and for enforcement activities, FLO is concerned with matters of foreign use or transit of Canadian waters in the Arctic. With respect to environmental law in particular, FLO has responsibility for co-ordination of Canadian action taken at the international level to prevent ocean pollution in a manner consistent with the 1970 Arctic Waters Pollution Prevention Act.

FLO concentrated its efforts towards the sixth session of the Third United Nations Law of the Sea Conference which is to meet in New York, and which is intended to achieve a comprehensive internationally recognized regime for the world's oceans and offshore seabeds. With respect to the Arctic, FLO placed considerable effort on achieving international recognition by the conference of the special rights and responsibilities of coastal states with respect to setting standards for the prevention of pollution from ships in Arctic ice-infested waters. The division played an active role in the discussions in the OECD and UNEP on environmental issues, such as trans-frontier pollution and liability and compensation, which was relevant to the Canadian Arctic.

The Department of External Affairs also deals with exchanges of scientists, senior foreign editors or other media personnel and foreign government officials who wish to tour the Arctic; this process is facilitated with the aim of encouraging the expansion, among the foreign public, of knowledge of Canadian developments, and of inducing an interchange of ideas on methods of dealing with problems peculiar to all Arctic areas. Abroad, the posts maintained by the Department of External Affairs attempt to facilitate the travel and education of Canadians wishing officially or privately to examine governmental and non-governmental practices in northern areas of foreign nations; the missions also gather information on such topics for the use of various government departments and agencies in Ottawa.

The Northwestern European Division (GEC) provides assistance and liaison for co-operative activities between Canada and the Nordic countries in their Arctic territories. During 1976-77 the Secretary of State, the Hon. Hugh Faulkner, visited Denmark, including Greenland and Norway to study points of comparison between Canadian and Nordic governmental planning for aboriginal popula-

tions. Mr. Faulkner was thus able to familiarize himself at first-hand with developments affecting the Greenlandic Eskimos and the Lapps of Norway.

The *Bureau of United States Affairs (GWA)* is responsible for co-ordinating Canada-USA relations in the Arctic. Among other issues, there have been interdepartmental and inter-governmental consultations on exploratory drilling in the Beaufort Sea and negotiation of an agreement with the USA, signed in February 1977, covering the reconstruction of the Canadian section of the Haines Road and the Alaska Highway from the Haines Junction to the Alaska/Yukon borders. The bureau also has an interest in the bilateral aspects of the possible construction of a northern pipeline. Despite continuing efforts by Eastern European Division (GEA), it has not been possible to engage in a meaningful exchange with the USSR in Arctic matters. The difficulties in obtaining reasonable reciprocity remained an important limiting factor especially in the field of Arctic sciences.

In the social and cultural field, the *Division of Cultural Affairs (FAC)* is responsible for world-wide exhibitions of travelling collections of Canadian art, including five collections of Inuit prints which have been shown in galleries and museums.

The Information Division (FAI) sponsored showings in Europe and the USA of a major exhibit on the North which demonstrates the proximity of northern lands, the similarities of environment and the perils of technological impact on that ecologically vulnerable region. The exhibit focused attention on the peoples of five major Arctic regions: Alaska, Canada, Greenland, Scandinavia and the USSR. First shown in the Netherlands, the Circumpolar Exhibit was shown in England, Denmark, Norway, Sweden, Finland and the USSR during 1975 and 1976. During 1977 and the early part of 1978 it will be on display in Germany.

A permanent arts and crafts exhibition featuring Native Canadian handicraft is currently being shown in Australia and an exhibit of Inuit and Indian works of art is on display in New Zealand.

The Visits and Speakers Section of FAI has sponsored a number of visits to the North of prominent foreign journalists and opinion-formers from Germany, the United Kingdom, Poland, the USA, South Africa, Korea and Yugoslavia. Undoubtedly more visits will occur in the future as interest by foreigners in Canada's North increases.

The division's Creative Services has prepared numerous articles and photostories on

Canada's North for Canadian Embassy publications in the USA, the United Kingdom, the Netherlands, France, India, Australia and Japan. In 1977, for example, a new Spanish language publication entitled "Canada Hoy", was produced by the Canadian Embassy in Mexico City and contained a feature article on the Canadian Arctic.

Articles on the North continuously appear in the department's publication *Canada Weekly* which is published in four languages.

The division has and will continue to distribute governmental as well as non-governmental publications on the North to all our embassies abroad and to purchase for presentation to distinguished persons abroad suitable books and examples of northern handicrafts, such as Eskimo prints and carvings. The Department of External Affairs will continue to maintain its interest and activities in the international aspects of private and governmental activities in the North.

Department of Fisheries & Environment (DFE)

Environmental Services

Atmospheric Environment Service

Responsibilities

The Atmospheric Environment Service (AES) is responsible for:

- provision of historical, current and predictive meteorological, ice and sea-state information services for northern areas;
- monitoring air quality;
- providing advice and consultation on the effect of meteorological, ice, and sea-state conditions on natural processes and on human activities in the Arctic;
- advice and consultation on the effect of human activities on the Arctic atmosphere; and
- undertaking research and development to increase knowledge of atmospheric processes and of the dynamics of ice and windwave interactions, and to improve the information services.

Plans for 1977-78

Generally, AES will continue to investigate the Arctic atmospheric environment, its effect on other natural environmental processes and on human activities, and the effect of human activities on the Arctic atmospheric environment.

More particularly, AES will continue to support the extension of the operational and climatological atmospheric data acquisition network in the Arctic, specifically through the utilization of automatic stations. This is essential to improve present knowledge and climatological services in the area. It is expected that more contract stations will be operated by native people.

In addition, AES will participate in special Canadian government Arctic programs, such as the ice-covered waters program. Our participation in such programs will be dedicated toward providing specialized meteorological ice and sea-state services to Arctic resource development operators.

Central Services Directorate

Review of 1976-77

Applications and Consultation

The Central Services Directorate (CSD) provided a broad range of consultation on the meteorological aspects of design and operation, and on environmental impact problems.

Work continued on a study of climatic and

related factors in the Canadian Arctic islands and adjacent waters to produce a comprehensive reference work designed to meet the needs of a variety of users. Preliminary planning for evaluating weather and weather-related conditions that would be encountered in marine areas of the Canadian Arctic was completed. Other completed or on-going projects included a comparison of the weather conditions at off-shore and coastal location of Melville Island, NWT, a study of low-temperature fog occurrence in the NWT and a climatological report for Nahanni National Park. Field work for an agroclimatic classification of the Yukon and Northwest Territories was completed during the year.

Time series of significant climatic parameters for 25 stations in the Canadian Arctic were statistically analyzed. The results are being studied to detect trends and monitor fluctuations. Current snow and sea-ice boundaries have been monitored weekly since the fall of 1976 and compared with the corresponding long-term average positions to assess their response to and possible effects on climatic fluctuations.

CSD continued to co-ordinate AES inputs for a National Research Council (NRC) text on snow, revising and completing three chapters of the book. Various aspects of snow are discussed, including distribution, physical characteristics, methods of measurement, drift control and snow roads. Although designed for use in all snow areas, it should be of value to northern activities generally.

Continuing support was provided to the Environmental Assessment and Review Process (EARP) assessments of Arctic development proposals. Planning began for the departmental Ice-Covered Waters Program and the proposed Eastern Arctic Marine Environmental Study (EAMES).

Ice Reconnaissance and Forecasting

Intensive operational ice reconnaissance and ice forecasting and advisory services in support of northern marine activities continued. Approximately 2550 hours of aerial ice reconnaissance were flown using AES chartered aircraft, military flights of opportunity, and other fixed-wing aircraft. Additional data were obtained from AES ice observers assigned to Transport Canada icebreakers, including reconnaissance missions flown in ships' helicopters. Remote sensing instruments on the AES chartered aircraft supplemented the data.

Usual ice forecasting services were provided. In addition, a forecaster was dis-

patched to the Beaufort Advanced Base at Tuktoyaktuk during the period of the Canadian Marine Drilling Limited (CANMAR) operations. Although ice conditions cleared very slowly in the Beaufort Sea area during the early summer of 1976, ice remained well offshore until drilling had ended in the autumn. Special ice forecasts were issued when an extended drilling season was considered.

Incorporation of NOAA-VHRR and LANDSAT imagery in near real time with visual ice observations supplemented aerial coverage and improved the quality of ice chart and forecast services to users. Problems in chart data delivery to ships from shore-based radio facsimile remain unresolved.

The number and variety of requests for consultation and advice on Arctic ice climatology increased during the year. The text for an *Ice Atlas of the Eastern Canadian Seaboard* was under final review at year-end. In preparation of an *Ice Atlas of the Canadian Arctic*, digitizing and quality control of 18 years of ice data were undertaken, with financial support provided by TC's Transportation Development Agency.

Training

CSD continued to provide training in support of forecasting presentation and data acquisition activities and in particular, the training of console operators for weather observing duties on the DEW Line.

Plans for 1977-78

The Central Services Directorate will continue to provide consultation services, support for EARP, planning for EAMES, training programs, operational ice reconnaissance, and ice forecasting and advisory services in support of northern marine activities.

A study of climatic and related factors in the Canadian Arctic islands and adjacent waters will be completed.

An agroclimatic classification of the Yukon and Northwest Territories, including 1:250 000 scale maps, should be completed by late 1977.

Work will be undertaken on wind, structural icing and waves encountered in marine areas of the Canadian Arctic, and their relation to the design and operation of off-shore drilling programs.

Field Services Directorate

Responsibilities

Regular Observations

To fulfill continuing and increasing requirements for meteorological data in Canada's northern area, Field Services Directorate (FSD) operates three types of permanent meteorological observing networks in accordance with established international standards.

The climatological network includes 117 stations where daily temperature extremes and precipitation are recorded and forwarded to AES regional offices and to headquarters in Downsview, Ontario.

At the 15 stations, in-depth soundings of the atmosphere are taken with balloon-borne instruments. Observations of temperature, humidity and wind from the surface up to 30 km are transmitted to national and regional weather centres for immediate processing.

There are 51 sites in the synoptic network where surface-based instruments and visual measurements of air temperature, humidity, barometric pressure, wind, cloud, precipitation and visibility are made at three- or six-hour intervals, or hourly as required for aviation. These observations are also transmitted immediately on AES communications circuits.

Review of 1976-77

The observing programs at Arctic Bay and Johnson Point were terminated during the year. A Contract Weather Reporting Station was established in November, 1976 with the Nanisivik Mining Company at Strathcona Sound, NWT to provide nine hourly aviation weather reports daily.

A hydrogen fire at the Eureka, NWT station on August 4, 1976 started in the electrolyser gas generator causing \$15 000 damage.

A Meteorological Automatic Reporting Station (MARS) was installed in Tasiilaq, YT, the second such station in use in Northern Canada; the other at Port Radium, NWT. An Arctic version of a Magnetic Tape Event Recorder (MATER) was installed in the Eastern Yukon near the Hess River in co-operation with the Department of Indian and Northern Affairs. In the Spring of 1976, an automatic weather station was placed on the sea ice 450 km north of Tuktoyaktuk. This station is powered by a wind turbine and communicates its observations via the GOES satellite. Weather measuring instruments were installed on the CANMAR drill strip to obtain weather reports from drill sites in the Beaufort Sea.

In addition to these observing programs, 12 government vessels and 10 commercial ships reported marine weather observations on a regular schedule during the navigation season.

Special Observations

Other observation programs continued in 1976-77 including 59 sites reporting freeze-up and break-up data of the ice cover on the sea, lakes, streams and bays; 24 sites reporting weekly measurements of ice thickness; 31 sites reporting shore ice conditions during the navigation season; and 28 snow survey sites reporting weekly measurements of depths and water equivalent of snow accumulation. Testing of the hot-wire gauge to measure ice thickness indicated this was not a feasible method.

Duration of bright sunshine was recorded at 25 sites; observations of noctilucent cloud at 17 sites; solar and terrestrial radiation at 14 sites; soil temperatures at a number of levels below the earth's surface at six sites; and water evaporation during the summer season at eight sites, three of which utilize tritium as a radioactive tracer. Bi-monthly runway soil temperature readings were initiated at Resolute, NWT in 1976 for Transport Canada. Weekly carbon dioxide (CO_2) flask sampling continued at Alert, NWT (one of three monitoring stations in Canada). Chemical pollutants in precipitation were measured at Fort Reliance, Mould Bay and Fort Simpson; air turbidity was also measured at Fort Simpson. Daily measurements of the total ozone in the atmosphere and weekly measurements of the ozone layer in the high atmosphere by balloon sounding equipment, were reported by the upper air station at Resolute.

Scientific & Logistic Support

Programs for other government agencies continued at AES Arctic stations. AES staff operated and maintained a neutron monitor gamma-ray project for NRC's Herzberg Astrophysics Institute of Ottawa. For the Department of National Health and Welfare, radioactive sampling of the atmosphere was carried out at five sites. Observation of seismological records was undertaken for the Department of Energy, Mines and Resources at Inuvik, Frobisher and Whitehorse. Support was provided by Energy, Mines and Resources staff by AES at Baker Lake, Resolute, Alert and Mould Bay. AES continued to operate weather stations under the title High Arctic Weather Stations and provided a wide range

of support to government and other scientific agencies at Resolute, Isachsen, Mould Bay and Alert.

Personnel

The staffing of the 66 principal (upper air and synoptic) weather stations at the close of 1976-77 was as follows:

AES – 14
AES/CATA (DOT) – 8
CATA (DOT) – 13
DEW Line – 17
Contract – 12
Automatic Stations – 2

A number of sites in the climatological network continue to be staffed by native people, and four principal stations (Cape Dorset, Koartak, Old Crow, and Pond Inlet) are staffed by Indians or Inuit.

Eight women are employed as upper air technicians at High Arctic Weather Stations and 10 women as AES meteorological technicians.

A pilot training course was held in Coral Harbour, NWT for inside and outside workers under the Arctic community airports program.

Six NWT residents were trained to observe, record and communicate aviation weather reports. Two Inuit participants from Eureka Point and Grise Fjord received on-the-job training, and were certified as weather observers.

Inspections

During the year, approximately seven man-years were devoted to inspection activities in the Arctic, including extensive preparations at the inspectors' regional headquarters in Montreal, Winnipeg and Edmonton, on-site quality control of weather observing procedures, on-the-job staff training, determination of proper site selection for the establishment of new stations, and maintenance and installation of instruments and equipment.

Major Construction Projects

New accommodation facilities were installed at Sachs Harbour. A new garage for trucks and airstrip maintenance equipment was constructed at Isachsen. A pre-fabricated surface weather station was erected near the Inuit community of Clyde River. The weather station at Cape Dorset was re-located in the new airport terminal building.

Communications

Various communications facilities are used in AES northern operations to transmit weather data on a real time basis for national and in-

ternational use, and to receive forecasts and advisories. Both teletype and facsimile communications are used through a combination of Transport Canada operated radio circuits, circuits in the DEW Line forward scatter facilities, and lease of circuits from the common carriers, some of which use ANIK.

A number of stations in the Yukon and Northwest Territories, including Inuvik, Whitehorse and Yellowknife have direct connection to the national weather facsimile system, operated by common carriers. Other areas of the Eastern and Central Arctic are served by radio facsimile broadcast from VFE Edmonton.

After each flight, ice reconnaissance aircraft crews operating out of Inuvik, Resolute and Frobisher transmit ice data in facsimile chart format over telephone or broadband circuits to the Ice Forecasting Central in Ottawa. While airborne, the aircraft make scheduled radio facsimile broadcasts to ships operating in the northern navigation areas.

Forecast Services

Weather forecasts for the North are issued regularly by AES. The technique of weather forecasting utilizes data from the Canadian North, as well as from all the northern hemisphere. The Canadian Meteorological Centre (CMC) in Montreal is responsible for broad-scale weather analyses, prognoses and selected forecast material. The centre is supported by a large computer and has access to weather satellite data and information from the World Meteorological Centre in Washington. Output from the CMC is distributed via teletype and facsimile throughout Canada, including the North, to support forecasting and weather service activities.

The Arctic Weather Centre in Edmonton produced forecasts for the NWT while forecasts for the Yukon were produced at Whitehorse. Current and predicted weather information for northern areas was routinely supplied as follows:

high-level winds and temperatures for aviation, produced by computer in Washington and distributed in Canada by teletype and facsimile;
lower-level winds and temperatures for aviation, produced by computer in the CMC in Montreal and distributed by teletype; weather forecasts for aviation in the North, issued from the Yukon Weather Office and the Arctic Weather Centre and distributed by teletype and radio;
general weather summary and forecast for the Arctic, prepared at Whitehorse for the

southern and central Yukon, and at Edmonton for selected locations in the NWT.

These forecasts reach the public by the CBC Northern Service and other private commercial outlets; marine forecasts prepared during the shipping season for Arctic coastal waters, Hudson Bay and the inland waters of Great Slave Lake, Great Bear Lake and the Mackenzie River. These forecasts are broadcast by Transport Canada Marine Radio stations on regular schedules; and fire-weather forecasts prepared during the forest fire hazard season by the Whitehorse Weather Office and the Arctic Weather Centre for the Yukon and Northwest Lands and Forest Services. Presentation technicians assigned to the forest area control centres in Whitehorse and Fort Smith provided fire weather services to meet particular user needs.

Weather services consisting of briefing, presentation and consultation were available at Whitehorse, Yellowknife, Inuvik, Resolute, Frobisher and Churchill. A more limited type of weather service was available at many other points with connections to the AES Communications System. Instruments for measuring meteorological parameters were replaced or installed at a number of sites. Instrumentation for use in the Arctic climate and with a potential for automation are being developed and evaluated.

The Arctic Weather Centre, under cost-recovery arrangements, implemented the Beaufort Sea Environmental Observation and Prediction System in July 1976 to provide wind-wave information and forecast services in support of Canadian Marine Drilling Limited (CANMAR) and Imperial Oil Limited (IOL) drilling operations in the Beaufort Sea area. The system was operated successfully until late October 1976. Ice information and forecast services were provided by the AES Ice Forecasting Central in Ottawa.

Field Services Directorate Resources

Approximately 17 per cent of FSD's resources were employed in Arctic operations, and an additional 17 per cent of FSD's headquarters and regional resources were utilized in the management of the Arctic operations. It is estimated that about 10 per cent of FSD's communications budget was utilized in support of Arctic operations.

Plans for 1977-78

FSD will continue all regular observing, communicating, forecasting and inspecting programs, including special projects in support of forestry, agrometeorology, resource development, and the Arctic community airports program.

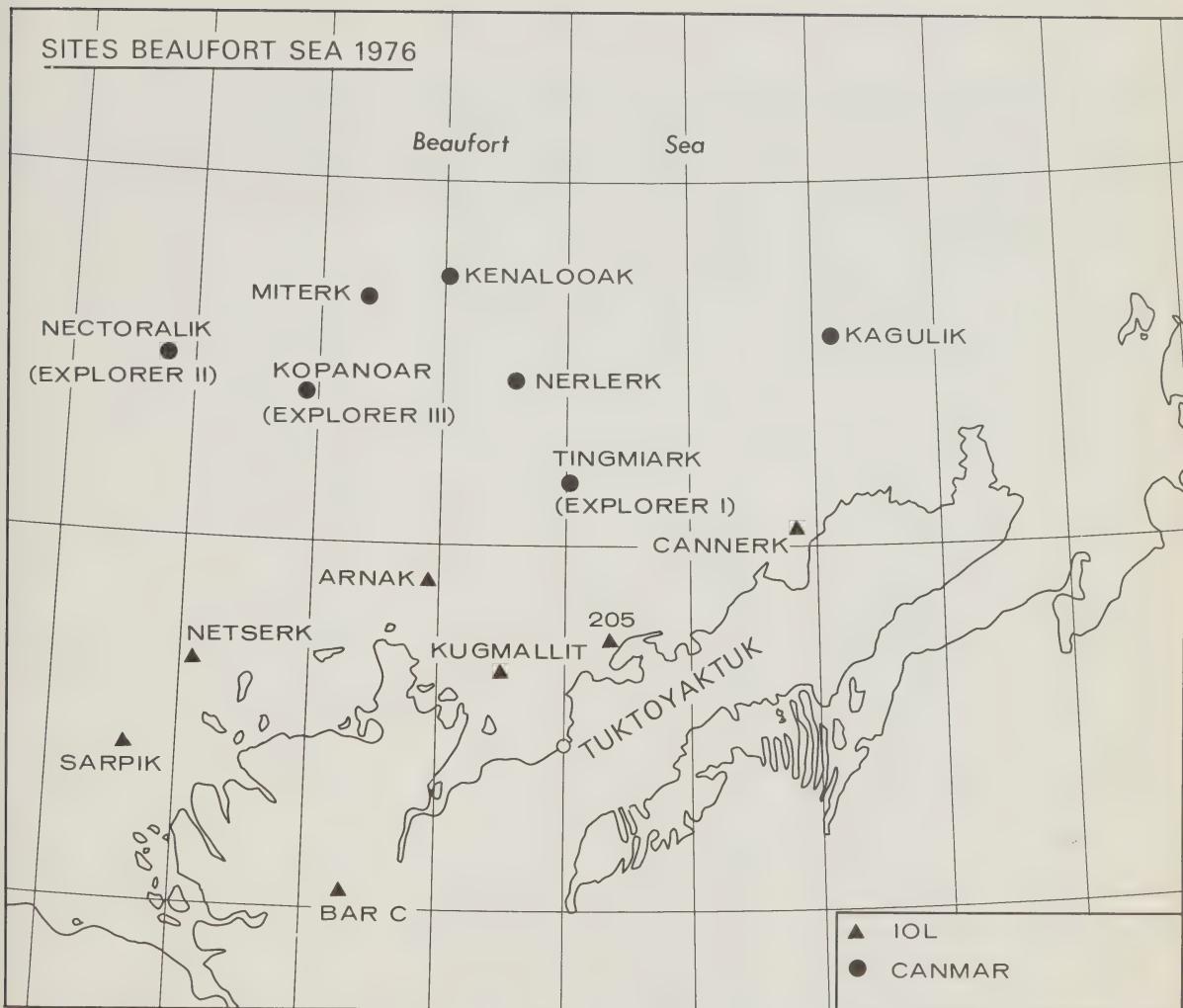
Drilling operations in the Beaufort Sea by CANMAR and Imperial Oil will be provided with meteorological, wind-wave and ice information and forecast services from AES' Ice Forecasting Central and the Arctic Weather Centre. An advance support base will again be operated at Tuktoyaktuk. Two automatic weather buoys, funded by CANMAR, will be placed on the ice northwest of the drilling area in the spring of 1977. Consultation will continue in regard to the environmental implications of Arctic developments in mining, oil and gas exploration, and proposed pipeline routes.

In co-operation with Parks Canada, AES will install a full climatological station in Pangnirtung to measure wind, humidity, evaporation and radiation in support of a hydrology study of Auyuittuq National Park. Also, MATERs will be installed in Kluane National Park.

Additional training courses for, and on-site certification of, native observer-communicators will be undertaken as required throughout the year in support of Arctic community airports program. Instrument installations will be inspected and certified; routine inspections and re-training will be conducted at the Atmospheric Aviation Weather Reporting Stations (AAWRS) sites. It is anticipated that Faro, Fort McPherson, Coppermine, Rankin Inlet, Repulse Bay and Cape Dorset will be certified as AAWRS sites.

Data acquisition facilities and programs will be expanded or improved as indicated below: Inuvik — install a new electrolyser; Isachsen — install a new 250kw power generator; Mould Bay — construct a new warehouse and renovate the power plant; Hall Beach — purchase material to renovate the weather office; and Killinek and Port Burwell — establish a synoptic station under contract employing local Inuit.

Commencing in 1977-78, Transport Canada will be responsible for aerodrome operations, aeradio communications, and aviation weather reporting at Eureka, Isachsen and Mould Bay. The maintenance of mobile equipment and main garages at those stations is also transferred from AES to Transport Canada.



1976 Beaufort Sea Sites

Administration Branch

Review of 1976-77

In 1976-77, the Administration Branch re-costed meteorological services provided to Transport Canada (TC) in support of aviation. As a result, charges to TC for meteorological services in the Arctic were reduced from \$3 422 000 for 1976-77 to \$843 200 for 1977-78.

Atmospheric Instruments Branch

Review of 1976-77

The Atmospheric Instruments Branch successfully tested a Climatological Automatic Recording Station (CARS) which was installed at Namycush Lake (241 km northwest of Cambridge Bay) in 1975. Objectives were to assess installation techniques, and to evaluate performance of equipment under Arctic

operational conditions. The system was removed in May 1976.

A new temperature sensor was installed in a MATER system located at Wahls Revenge, Yukon. MATER also records wind and rainfall data.

A Beaufort Sea station was installed on the ice approximately 290 km north of Tuktoyaktuk on June 21, 1976. Although still situated in the Arctic Ocean with data still being re-

ceived, it has drifted westward and its exact location is unknown. Attempts to locate the station in September and October 1976 were unsuccessful.

Maintenance technicians completed annual overhauls of Ground Meteorological Detecting (GMD) systems at several upper air stations in the High Arctic. Engineering evaluations were made of electrolyser hydrogen generator equipment at designated sites, and fire prevention/protection studies were instituted.

Plans for 1977-78

A test site may be established at Igloolik in winter to test a C-prop and a quartz-crystal temperature sensor.

A snow gauge study will be conducted at Cambridge Bay. Equipment is being built in support of a rain-making project near Yellowknife.

Atmospheric Research Directorate

The Atmospheric Research Directorate continued developmental work in atmospheric modelling applicable to the weather forecasting system to improve weather forecasts in Canada. A Computerized Prediction Support System (CPSS) was again implemented at the Arctic weather centre in Edmonton to provide support there and to the Beaufort Advanced Base at Tuktoyaktuk in forecasting weather, wind-waves and ice-floe motion for off-shore oil exploration sites in the Beaufort Sea. An experimental computerized weather office was also operated in Toronto simulating the real-time operation for the Beaufort Sea area carried out at the Arctic weather centre. An extensive evaluation of both operations was carried out. Specially processed environmental satellite imagery was provided in real time to the Ice Forecasting Central and to the Arctic Weather Centre by the Satellite Data Laboratory at Toronto. Satellite data was also provided in support of ice studies carried out jointly with Ocean and Aquatic Sciences (OAS), Department of National Defence (DND) and others. Development of an Observational Network Test System (ONTES), run on the CYBER computer in Montreal, continued. Initial tests using ONTES were designed to investigate the impact on forecasts of the removal of upper air data from up to three Arctic stations.

A three and one-half-week cloud seeding field experiment in co-operation with the National Research Council was continued at Yellowknife during July 1976 to assist in de-

termining whether rainfall enhancement can be used to suppress large forest fires.

Air quality research studies included air quality observations (turbidity and precipitation chemistry at Fort Simpson; carbon dioxide sampling at Alert) under the world-wide air quality monitoring program of the World Meteorological Organization.

Plans for 1977-78

Further development work to improve the CPSS for the Beaufort Sea area will be carried out. Development of a similar system (or systems) for other Arctic locations should commence. Investigation is expected to start on models to predict the motion of oil slicks on the water. Development of a computerized system to fully exploit meteorological satellite data (imagery and vertical sounding information) for the Arctic will continue.

Continuation of cloud seeding research is anticipated in the summer of 1977.

Development of a model to link meteorological parameters with potential air pollution damage to Arctic vegetation will be investigated. Research on the relationships between meteorological conditions and damage to lichens by sulphur dioxide will be continued. Water balance and hydrometeorological processes of Baker Creek Basin will be studied.

Environmental Management Service

Responsibilities

The Environmental Management Service is responsible for overall co-ordination of work carried out by the Lands, Forestry, Wildlife and Inland Waters Directorates. It also deals with environmental assessments and provides general leadership in the management, for continued productivity, of some of Canada's major renewable resources.

In general, its responsibilities include:

- national land use policy and planning initiatives in co-operation with other federal and provincial agencies;
- land use studies related to use dynamics of the resource;
- management and operation of a national land data bank;
- collection and analysis of data for forest policy and program planning;
- research and development for forest products;
- international forestry relations;

- forestry information and technology transfer;
- migratory bird conservation and protection;
- wildlife advisory services and information to government and other agencies;
- wildlife research on toxic chemicals, wildlife pathology, interpretation, information and biometrics;
- wildlife research and management in co-operation with provincial and territorial governments;
- defence of rare and endangered species;
- assessment of the effect of resource development and other operations on wildlife;
- initiation of national programs for the planning and implementation of water resources development and water quantity and quality research;
- development of policies and systems for hydrometric data collection and networks, water and ice inventories and forecasting; and
- management of regional structures for federal forestry, water and wildlife operations.

Lands Directorate

Responsibilities

To supply and analyse data for land-based renewable resource inventories, regional planning, and the assessment of resource development impacts.

Land Evaluation and Mapping Branch

Review of 1976-77

With the support of the Arctic Land Use Research (ALUR) Program of the Department of Indian Affairs and Northern Development (DIAND), 30 Land Use Information Series maps, updating coverage along the Mackenzie Valley, were published in the fall of 1976.

The maps, produced at a scale of 1:250 000 (2.54 cm to 6.4 km) integrate a wide range of data on renewable resources and related human activities. Each map is complete with a detailed legend and descriptions. The map series includes current information on:

- critical and important wildlife areas;
- fish resources and fishing;
- recreation and tourism potential and facilities;
- land use by natives for hunting and trapping;
- notes on communities;
- development areas and block land transfers;

forest, mineral and soil resources; archaeological and historical sites; proposed International Biological Program (IBP) reserves; and parks and sanctuaries.

Land Use Planning Branch

Review of 1976-77

As part of an ongoing review of existing land use policies and legislation in Canada, the Land Use Planning Branch will be publishing a report on the northern territories towards the end of 1977. This report, one of a series of 11 covering each province and the territories, is entitled *Land Use Programs in Canada*. The paper will discuss potential problems and major concerns of the territories with regard to land use and land ownership. The role of territorial and federal departments engaged in land use planning and land management will be outlined and pertinent legislation examined.

Plans for 1977-78

The Land Use Information Series is being extended to cover the area between Yellowknife and Coronation Gulf. Field Research will be carried out during the summer of 1977, and publication of these maps is expected in 1978.

Canadian Forestry Service

Responsibilities

To advise and assist DIAND on forestry operations, practices and staff training:

- to participate in the conduct of environmental impact assessments of major industrial developments;
- to conduct forest insect and disease surveys;
- to prepare forest inventories and maps of forest and other vegetation;
- to conduct ecological research in the North;
- to compile national statistics on forest stocking, growth, depletion and annual fire losses.

Pacific Forest Research Centre (PFRC)

Review of 1976-77

Work undertaken in this period was confined to the Yukon Territory where preliminary field investigations were made on the interaction of permafrost, vegetation and landform. Samples were taken at various locations in the

Liard ecoregion, but work was hampered by poor flying weather.

Work continued on the test sites at Watson Lake and Whitehorse using Landsat imagery and superimposed classification systems to differentiate vegetation sites and assist in defining the productive capacity of forest land.

Yukon RRAMS, an information retrieval system for renewable resource and management statistics, was developed and the forestry file is now available and accessible from terminals in Whitehorse. As a result of this work it was found that the Yukon Territory is 54 390 km² smaller than was previously stated. The Department of Energy, Mines and Resources (EMR) had earlier specified the area as being about 536 130 km² but, in implementing the RRAMS system, the area was computed as being 481 740 km². EMR is verifying the figure and preliminary calculations indicate that the new figure is correct.

Container planting and seeding trials with white spruce and lodgepole pine continued in the Watson Lake area but high water levels were a problem during June and July. Measurements of seedling presence, size and response to treatment were carried out.

Fire research personnel provided advice and were available for consultation on fire prevention, fuels management and the Canadian Forest Fire Weather Index. New tables for use with the index were supplied to the Yukon Lands and Forest Service.

Routine ground surveys of forest insect and disease conditions were carried out from late June to mid-July, 1976, followed by an aerial survey of forests of the southern Yukon Territory. The larch budmoth (*Zeiraphera improbana*), which caused severe defoliation north of Watson Lake and the Hyland Valley, and spruce bark beetle in windfall spruce continued to be the most serious problems. A special study of the impact of the spruce broom rust (*Chrysomyxa arctostaphyli*) indicated that approximately five per cent of the trees are infected seriously enough to cause a 20 per cent increment loss. A report on forest insect and disease conditions for 1976 was issued to forest managers in the Yukon.

Plans for 1977-78

An integrated resource survey, encompassing timber and wildlife needs within a biophysical framework, is proposed for the Nisutlin River Forest Management Unit. Based on a design that utilizes large-scale aerial photography and a minimum of ground sampling, the survey will provide quantitative estimates of the

forest resource and the capacity of the land to carry various species of wildlife.

The survey, over two to three years, is an operational test of current survey technology. Co-operators are the Yukon Lands and Forest Service, Pacific Forest Research Centre and the Forest Management Institute.

A proposal to establish a demonstration area for forest harvesting and silvicultural treatments will be considered. Recognizing that harvesting methods should be geared to the growing site and the species being utilized, a scheme will be proposed that encourages selective harvesting, good utilization and natural regeneration.

Regeneration trials will continue along with work on developing seed zones for the Yukon. Personnel will also be trained to participate in the annual cone crop forecast.

PFRC Fire Research will continue in an advisory service role to the Yukon in 1977-78. Information and advice will be available on fire-danger rating, meteorological influences, fuel management and use of infra-red fire-detection equipment. Demonstrations and instruction on use of the aerial ignition device will be provided.

The Forest Insect and Disease Survey will continue in June and July, 1977, with continuing emphasis on the establishment of permanent sampling stations for spruce budworm defoliators. Wood-borers in decked logs and the impact of disease organisms will receive particular attention. Aerial surveys and photography of pest-damaged stands will continue.

Northern Forest Research Centre (NFRC)

Review of 1976-77

The Northern Forest Research Centre continued to conduct environmental studies in anticipation of northern energy transportation development. Progress achieved in the Mackenzie Valley has permitted a shift in emphasis to the Arctic Islands and the eastern Arctic. Field studies for the Polar Gas route in the Arctic Archipelago and in the Low Arctic of the mainland concentrated on terrain-vegetation-permafrost relationships and possible effects of pipeline development on the terrestrial environment. Such work, together with a consultant's contracted studies, will provide background information on environmental characteristics in preparation for a review of industry proposals to develop pipelines from the Arctic Islands to points in southern Canada.

Members of the Fire Research Group provided advisory services and lectures for the Northwest Lands and Forest Service and Parks Canada on fire detection, fire-danger rating, airtanker/retardant operations, and fire effects. A study was initiated to analyse the last 10 years' fire statistics for the Northwest Territories, to calibrate the Fire Weather Index system and to characterize the occurrence, behaviour and effects of wild-fires north of 60°. In Nahanni National Park, a field reconnaissance of old burns was carried out to serve as a basis for fire history and fire hazard mapping. A study of the effects of latitude, season and forest vegetation on net radiation in northern areas was completed.

Plans for 1977-78

For the Arctic Islands Pipeline Program and the Polar Gas Project, field studies and assessment processes are expected to continue in the light of sustained interest in development of the Polar Gas route.

Fire researchers will continue to provide advisory services and lectures on fire prevention, detection, pre-suppression and suppression topics. An analysis of the past 10 years' individual forest fire reports will be completed and recommendations made to maximize the use of the Fire Weather Index. The Nahanni Park study will enter the field work phase aimed at mapping fire history and fire hazard. Recommendations will be made to facilitate development of a fire management policy for the park.

Forest Management Institute

Review of 1976-77

Co-operation with Parks Canada, including the provision of basic data on land-vegetation complexes in selected national parks across Canada continued. Within this program, work is proceeding on the Nahanni National Park in the Northwest Territories.

Plans for 1977-78

The Nahanni Park study will be completed during 1978. The institute will also co-operate with the Yukon Lands and Forest Service and the Pacific Forest Research Centre on an integrated resource survey on the Nisutlin River Forest Management Unit. (Details above: see Forest Research Centre.)

Forest Fires Research

Review of 1976-77

The institute continued to do research in support of fire-weather forecasts prepared by AES. At Yellowknife, it also continued to cooperate with and support AES in cloud-seeding research. The objective is to explore the feasibility of using rainfall enhancement techniques in suppressing forest fires.

Plans for 1977-78

Research will be continued in support of fire-weather forecasts prepared by AES and cloud-seeding research along the lines of that conducted at Yellowknife.

Canadian Wildlife Service

Responsibilities

The Canadian Wildlife Service conducts research, management and administration of migratory birds under the Migratory Birds Convention Act and the Canada Wildlife Act; co-ordinates federal, provincial and territorial action on common wildlife problems; conducts surveys and inventories of wildlife resources; recommends management procedures for particular species of economic or aesthetic importance; undertakes or sponsors research on wildlife species in relation to their habitat; collects and analyses animal population and utilization data; and conducts studies of wildlife diseases and the effects of toxic chemicals on wildlife or their habitat.

Review of 1976-77

Work undertaken in the North in 1976 included investigations of: big game species of the Yukon and Northwest Territories; wildlife and wildlife habitat located on potential energy corridors in the Western and High Arctic; the biota of areas subject to the increased tempo of petroleum exploration; wildlife in the new northern national parks; and the endangered raptors and the recreationally and aesthetically valuable waterfowl resources, principally geese.

Mammalogy Projects

Review of 1976-77

A major study of population ecology of the Peary caribou on the Queen Elizabeth Islands is continuing. Demographic studies have been largely completed and major emphasis is in determining causes of a significant decline in Peary caribou productivity and numbers.

Studies of the population ecology of the barren-ground grizzly bear are now in progress to determine the discreteness of that group by distribution and other characteristics.

Studies of the Bluenose herd of barren-ground caribou were concluded and a major report on the results is being compiled relative to the population dynamics of the herd, its management, and prediction of risk from pipeline construction.

Bison studies in the Slave River Lowlands north and east of Wood Buffalo National Park have been concluded, and results of the Canadian Wildlife Service contribution to that study are now being written. In June 1976, 972 bison were vaccinated against anthrax at Wood Buffalo National Park by Canadian Wildlife Service pathologists.

Plans for 1977-78

The studies of the population ecology of the barren-ground grizzly will continue.

Work on Western and Eastern Arctic populations of polar bears will include further delineation of denning areas and studies of the population dynamics of the bears and their major food source, the ringed seal.

The study of the population ecology of Peary caribou in the Queen Elizabeth Islands will continue. Investigations on demography, herd sizes, natality, mortality and recruitment will be part of the general study of these caribou. Determination of measurable biological parameters, which may be involved in the drastic drop in numbers, will be another goal of the 1977-78 research activities.

Environmental Studies

Review of 1976-77

Further studies of muskoxen and Peary caribou on Melville Island and elsewhere are continuing. These include work on possible harassment of the animals in relation to a proposed Eastern Arctic Pipeline.

Surveys and inventories of natural re-

sources of national parks in the Yukon Territory and the Northwest Territories were carried out on behalf of the National Parks Branch of the Department of Indian Affairs and Northern Development.

Plans for 1977-78

New studies are planned in the Yukon Territory relating to the impact of the Dempster Highway on the Porcupine herd of caribou. An evaluation of an area identified as a possible International Wildlife Range in the northern Yukon Territory will be undertaken.

In the Northwest Territories a continuation of ecological studies for AIPP is expected. New studies of birds and polar bears relating to off-shore exploration and drilling off Baffin Island are planned. Harassment studies relating to barren-ground caribou will be conducted on Baffin Island.

Ornithology Projects

Review of 1976-77

Major studies of the population and breeding ecology of seabirds in the Barrow Strait-Lancaster Sound Area, on behalf of the Arctic Island Pipeline Project (AIPP), were concluded. Aerial census techniques for estimating populations of lesser snow geese, which were developed in the Eastern Arctic, were applied to Western Arctic colonies and included the first major attempt to estimate the numbers of the closely related Ross' geese nesting in the Queen Maude Gulf Area. Analysis of the data is proceeding.

Contracted studies of the nesting biology behaviour and genetics of lesser snow geese continued at La Perouse Bay, near Churchill, Manitoba.

A contract study of the Ross' goose in the Queen Maude Gulf Area was concluded. This work covered its breeding biology and vulnerability to sport hunting.

General studies of seabirds in Davis Strait, Baffin Island and Labrador were initiated. These studies cover the history, colony distribution and breeding biology.

A re-survey was made of eider duck populations at Cape Dorset, Baffin Island. An operational system using Landsat imagery relating to snow cover was developed to provide forecasts of probable numbers of Arctic nesting geese. This approach gives sufficient lead time to permit use of survey results for establishing National and International Migratory Game Bird Regulations.

Whooping crane nesting surveys continued

with accelerated mapping of sightings. The egg transplant program to Grays Lake, Idaho, continued.



Trapping snow geese on Baffin Island for banding operations. Trapping coincides with the moult period when the birds are flightless.

Plans for 1977-78

An additional year of study on some aspects of seabirds in the Barrow Strait-Lancaster Sound is planned as part of a multi-year investigation undertaken on behalf of the AIPP.

The Whooping Crane egg transplant program to Grays Lake, Idaho is expected to continue.

Inland Waters Directorate

Responsibilities

To plan and participate in national and international programs of water management, with the objective of providing Canadians with maximum economic and social benefits, giving full consideration to environmental concerns. Program areas include:

- boundary waters activities;
- planning and implementation of plans for river basins, coastal zones and shorelines;
- setting of water quality objectives;
- flood damage reduction;
- water aspects of environmental impact;
- regulation and interjurisdictional allocation of water;
- forecasting of water supply and demand;

research and monitoring of water quality, water quantity and sediments; scientific and technical water information; and public information on water and water-related matters.

Water Resources Branch

Glaciology Division

Responsibilities

The responsibilities of the Glaciology Division are:

- to establish a federal research centre to provide leadership in the study of glaciology;
- to develop new concepts on the hydrologic processes in the North; and
- to study the structure and physical properties of snow and ice and their relationships with the environment; and
- to develop computerized data storage and retrieval systems pertaining to glaciers for federal, provincial and territorial water resources agencies, educational institutions and industrial concerns.

Review of 1976-77

The glacier inventory of the St. Elias Range is being extended into northern coast and boundary ranges. Maps of glaciers identified in the southern two-thirds of Ellesmere Island are in final stages of preparation for printing. Bibliographies of the ice core drilling, rock glaciers and of the St. Elias Range are being compiled.

With support from the Polar Continental Shelf Project and using a Wild RC-10 aerial camera, air photos were taken to monitor the break-up of the Mackenzie River with special emphasis on ice-jamming. The Trafalgar Lakes, near Resolute Bay, were photographed twice for a radiation study and the artificial islands off the Mackenzie Delta were also covered as was the Polar Gas pipeline route from Spence Bay to Baker Lake.

On Somerset Island and Boothia Peninsula, a general correlation was found between elevation and snowmelt although accumulation and redistribution factors were seen to modify this relationship. Results are based on interpretation of snowmelt conditions from satellite imagery (mainly LANDSAT) for 1973, 1974 and 1975 along potential routes of the Arctic Islands pipeline. Similar work in the Baker Lake region consisted of a basin hydrologic study to assess snowmelt peaks. Pipeline crossing sites on rivers south of Baker Lake were examined for signs of ice-jam formation and resultant erosion. A detailed study was also made of the break-up of the Kazan and Thelon rivers.

Along the Mackenzie Highway snowmelt peaks were assessed at culvert sites. Icing of the culverts caused high velocities detrimental to fish passage. Snow water-equivalent was measured at snow courses throughout the Mackenzie Valley.

In the Inuvik and Resolute Bay regions, field studies were undertaken of the attenuation of solar radiation (300-100 mm) on ice-covered lakes during May and June. Water quality is being correlated with the radiation regime of the lakes resulting from solar radiation/ice cover interactions. The study of light intensity and life productivity under sea ice containing entrapped crude oil was completed with a final visit to Balaena Bay and the publication of results.

In the Icefield Range of the St. Elias Mountains semi-final preparations were made for a 1978 core drilling on the northwest col of Mount Logan as part of a climatic fluctuation study. Two 8 m cores were taken to substantiate results from the 1975 16 m core. Strain rate and movement measurements were

made and a single radio echo-sounding traverse was flown to aid in the core hole site selection.



Kaskawulsh Glacier in St. Elias Mountains

On the Barnes Ice Cap, Baffin Island, three continuously recording 5 m wire strain meters (Cambridge type) were installed at several sites within the South Dome surge area. Strains over 5 m gauge lengths generally showed a smooth behaviour and at one site a probable periodic variation seemed to exist independent of temperature or pressure changes. Strains over the various 50 and 500 m lines measured concurrently during a three-week period in May were irregular, even considering the much larger errors in measurement involved.

Plans for 1977-78

Many of the research activities of past years will continue with changes in emphasis, with new projects introduced as conditions warrant.

Research into the hydrologic implications of northern pipelines and roads in the Mackenzie District will be focused on the Inuvik-Tuk region, on the Wrigley-Norman Wells area and on the lower Liard River Valley. Some work on the Arctic Islands Pipeline Project is contemplated in the vicinity of Baker Lake and at river stretches overlapping proposed pipeline crossing sites.

The attenuation of radiation in the visible spectrum by lake ice and its effect on flora

and fauna will again be studied in lakes near Inuvik in the Mackenzie Delta.

Data obtained from ice cores during the 1978 drilling program on Mount Logan will be compared with other data such as the local dendrochronology in order to develop a climatic history of the area.

There will be a continuing concern to improve understanding of behaviour of large ice masses; to obtain long ice cores from large glaciers and analyse these as a means of obtaining data on environmental change; to complete a map series of all calving glaciers with estimates of the rate of ice discharge from each; and to develop a project that focuses on the hydrologic regime of basins in environments characterized by permafrost, low temperatures and extensive periods of snow cover. Special attention will be given to the hydrologic implications of resource development.

Applied Hydrology Division

Responsibilities

The main responsibility of the Applied Hydrology Division is to provide technical support for the operation of the Water Survey of Canada. It includes the following:

development of techniques, instrumentation

and standards for the collection of streamflow, water-level and sediment data; development of techniques, instrumentation and standards (including computer programming for office procedures) in handling data and publication of resultant records; network planning and flow forecasting studies; special purpose of non-routine field surveys, including discharge measurements of large rivers; surveys of sediment deposition in reservoirs; photogrammetric surveys of glaciers; morphological surveys and studies of river channels, basins and estuaries; and operation of a sediment analysis laboratory for both operational and research purposes.

Review of 1976-77

The annual publication of stream discharges and lake levels in the Yukon and Northwest Territories for the year ending December 31, 1975 was distributed in October 1976. The information is also available on magnetic tape for computer use. An index of all streamflow and water-level stations in Canada, including the territories, was published.

The annual sediment data publications listing records of mean daily sediment loads for many streams across Canada, including some in the territories, were produced for the year 1973 in June 1976 and for the 1974 data year in January 1977. An index of all sediment stations in Canada to 1974 was published in January 1977.

Data Collection Platforms (DCPs) which transmit water levels and a variety of other data, such as temperature and recorder performance, to the LANDSAT 2 polar-orbiting satellite, have been operating with very high reliability since July 1972.

Plans for 1977-78

Additional satellite DCPs will be installed and operated by Water Survey of Canada personnel in 1977. Studies for a Canadian Satellite Telemetry System that would meet DFE requirements were conducted in 1976-77, and a contract has now been let for equipment to receive satellite signals.

More work will be carried out on a program to determine procedures for measuring winter flows of Arctic rivers.

Hydrology Research Division

Responsibilities

The Hydrology Research Division responsibilities are to:

- conduct federal research programs in hydrology with emphasis on the development of hydrologic techniques, methodologies and instrumentation for water resource evaluation;
- identify those operational areas in the water resource field where there are needs for research and to implement appropriate research projects and programs to meet these needs;
- develop and improve hydrologic models and to establish firm objective criteria for assessment of their reliability; and to gain a better understanding of hydrologic processes and interactions in order to place hydrologic modelling on a more deterministic base.

Review of 1976-77

The study of frost mounds developing annually in a spring area of Bear Rock, near Fort Norman, was continued. Detailed studies of sulfur-isotope geochemistry were completed on a group of springs near Paige Mountain northwest of Norman Wells. The hydrology and geomorphology of the karst area between Mahony Lake and Great Bear Lake were studied further using aerial photography and satellite imagery to compliment field observations. Testing of and experiments with electrical-resistance frost and freezing detectors were continued. Ground water discharge phenomena were surveyed in the areas of Pine Point (south of Great Slave Lake) and Nanisivik (Baffin Island). These surveys form part of a more general investigation of the interaction between ground water and mining operations.

An investigation was begun into the interaction of Arctic rivers and their associated subchannel permafrost. Test holes were drilled in May 1976 into the frozen streambed of the 'King River' on Melville Island, NWT. Thermistors were installed to show the seasonal changes in subchannel temperature for this "flashy" stream which freezes to the bottom in winter.

Plans for 1977-78

The study of permafrost beneath Arctic rivers will be expanded to include those that continue to flow during the winter season. A drilling program will be carried out near Inuvik, on cross-sections of rivers that have large lake

storages within their basins. The investigation will determine any depression of the permafrost table and the existence of any perenially thawed layers lying beneath river beds.

There will be continuing investigation of a variety of other northern hydrologic and hydrogeologic problems. Two important specific aims are to:

- gain improved understanding of factors controlling the occurrence and movement of ground water in permafrost areas and interaction between ground water and permafrost; and to
- be able to predict the potential modification of ground-water occurrence and movement by resource development activities, as well as possible undesirable environmental consequences thereof.

Water Survey of Canada Division

Responsibilities

The Water Survey of Canada (WSC) is primarily responsible for the collection, computation, and publication of surface water data for most of Canada. WSC works in co-operation with provincial governments and with other departments of the federal government. Besides operating a network of hydrometric gauging stations, WSC co-operates with other sections of the Inland Waters Directorate in the collection of water samples for quality analysis and operation of observation wells for ground water studies. It also constructs, operates and maintains water-level recording stations to provide information on tides and water levels for the hydrography branch of Ocean and Aquatic Sciences. The Water Survey of Canada operates laboratories for the analysis of suspended sediment and bedload samples.

Review of 1976-77

The second year of operation, under an arrangement between DFE and the Department of Indian Affairs and Northern Development, has proved the value of the co-operative program. The co-ordinating committees for the Yukon and Northwest Territories effectively carried out the responsibilities of planning and directing water quantity survey activities.

Ninety-eight hydrometric gauging stations were operated in the Northwest Territories and 48 in the Yukon Territory with water levels recorded at an additional 14 stations. Sediment observations were made at 11 sites in the Northwest Territories and six sites in the Yukon. Snow surveys were made for the 15th year at 10 locations to assist in the pre-

dition of snowmelt runoff in the Taltson and Nahanni river basins.

In co-operation with the Frozen Sea Research Group, a program was continued to collect surface water data from the d'lberville Fiord area of Ellesmere Island.

In the Northwest Territories, WSC monitored at eight temporary gauging stations for investigations for the Arctic Island Pipelines. Five permanent gauging stations were constructed in the Yukon Territory.

The forecasting service for main-stem Mackenzie River levels was continued. Data communications were further improved through greater use of LANDSAT satellite retransmission and telephone linkage.

A program to determine the distribution of flow and sediment in the Mackenzie Delta was continued as part of the Beaufort Sea studies.

Plans for 1977-78

Planning and operation of water quantity surveys in the Yukon and Northwest Territories will continue, guided by the co-ordinating committees established under the agreement between DFE and DIAND. The Water Survey of Canada will carry out field activities and publication of data. Twelve additional streamflow stations will be constructed in the Northwest Territories and in the Yukon.

Although investigations in the Mackenzie Delta, sponsored by the Beaufort Sea program were concluded in 1975-76, a limited in-house program will be continued to improve the knowledge of flow distribution in the Delta.

Hydrologic regime investigations will be continued along the proposed route of the Arctic Island Pipeline with emphasis on one site-intensive investigation, and on the Keewatin reconnaissance including a snowmelt and river ice study.

The tidal gauge network and water-level forecasting program will be continued.

Water Quality Branch

Responsibilities

The Water Quality Branch is responsible for the collection, analysis, interpretation and dissemination of water quality data in support of federal and federal-provincial programs across Canada. Baseline water quality data is obtained from specific reference points across Canada and is augmented by detailed information and data collection in comprehensive surveys undertaken in response to specific

water use requirements or environmental impact assessments.

Review of 1976-77

The Branch provides direct support for federal programs relating to National Parks and to data collection and surveys in the Yukon and Northwest Territories in collaboration with DIAND. A collaborative arrangement for laboratory services is in place at Yellowknife in which the Branch participates directly in analysis of samples collected in the territories under the DIAND program. This Branch activity is administered as a detachment of the Inland Waters Directorate laboratory at Calgary in the Western and Northern Region.

Plans for 1977-78

The Branch will continue to operate in northern joint basin studies with DIAND and other water oriented services in DFE. Programs are being developed to assess water quality trends in surface waters in the North.

Water quality objectives have been proposed for the Northwest Territories and the Yukon by an interdepartmental working group. These objectives will be submitted to the Territorial Water Boards with a recommendation for acceptance as the basis for water quality management planning and for the preparation of effluent discharge permits.

Water Planning & Management Branch

Responsibilities

The responsibilities are to:

develop comprehensive water resource studies and water management programs; provide an advisory service to the governments of the Northwest Territories and the Yukon on water planning and management matters; and participate in environmental assessments of development projects, in particular water management aspects.

Review of 1976-77

The Branch continued to participate in the review of water management aspects of projects which come under the Environmental Assessment and Review Process (EARP). Such northern activities as oil and gas pipelines, road construction, hydro dams, mining developments, an Arctic medium-draft terminal, and artificial islands in the Beaufort Sea came under assessment.

In July 1976, the Minister of Fisheries and the Environment and the Minister of Indian

Affairs and Northern Development signed a joint Memorandum of Understanding agreeing that the National Flood Damage Reduction Program should, as far as possible, apply to flood prone communities in the Northwest Territories and the Yukon.

It was also agreed that the flood risk mapping of Hay River and surrounding district was so urgent that it should commence without the completion of formal agreement or arrangement. This mapping program is expected to be completed by March 31, 1978.

The Branch continued to provide the Secretariat for the Mackenzie Basin Intergovernmental Liaison Committee and a new Task Force has developed a proposed intergovernmental agreement and a three-year study program, which has been endorsed by the Liaison Committee.

Plans for 1977-78

The development of formal arrangements for the application of the flood risk mapping program to other communities and of policies needed to discourage development in flood vulnerable areas is scheduled for completion by June 30, 1977.

The Branch will continue to participate in the review of projects which come under EARP. A federal-provincial ministerial meeting is scheduled for spring 1977 to consider the agreement and program. The Branch will perform the lead function for this new task force.

Environmental Protection Service

Responsibilities

To take action in preventing or combatting environmental problems that fall within Environmental Canada's terms of reference. These activities include problem surveillance, air and water pollution control, solid waste management, control and disposal of environmental contaminants, assistance in controlling activities having an ecological impact, noise control, response to environmental emergencies, and management of the federal government's own cleanup program.

To develop and enforce environmental regulations, codes, protocols and other protection and control instruments used to implement governmental legislation. To serve as the point of contact for the public and other governmental departments with Fisheries and Environment Canada on matters relating to the implementation of environmental protection. With regard to the North, the points of contact are located at headquarters in the Ottawa area and the established district of

fices in Whitehorse and Yellowknife reporting through the regional offices located in Vancouver and Edmonton, respectively.

Air Pollution Control

Responsibilities

To control air pollution from federal works, businesses and undertakings in the Northwest Territories and the Yukon; to control air pollution that may be a significant danger to health; and to exercise a leadership role in the national effort to abate air pollution.

Review of 1976-77

A summer survey of ambient dust levels in Inuvik was conducted. Sampling stations were arranged at a number of locations in town.

Work continued on the development of emission regulations for Arctic mining operations. Initial discussions were held with the Government of the NWT, and with industry in regard to implementation of the asphalt paving industry national guidelines and the Arctic mining operations emission guidelines, and their subsequent incorporation within the Environmental Protection Ordinance.

Leaded gasoline sampling was conducted at the Norman Wells refinery and at the Frobisher bulk storage facility in regard to the leaded gasoline regulations (Clean Air Act).

Preparation of final reports from the Yellowknife Environmental Survey (arsenic) continued. A technical data summary on arsenic was prepared for the CPHA task force investigating arsenic in the Yellowknife environment.

Operation and maintenance of the Yellowknife National Air Pollution Surveillance station continued.

The Yukon office continued the operation of the National Air Pollution Surveillance (NAPS) station at Whitehorse.

Approval in principle was reached between the Yukon Territorial Government and EPS on the adoption by YTG of guidelines under the Clean Air Act, as regulations under appropriate territorial ordinances.

The carbon monoxide monitoring program in Whitehorse was continued for the winter of 1976-77.

Plans for 1977-78

Discussions will continue with the Government of the NWT in regard to implementation of the guidelines and regulations in the territory and their impending incorporation in the Environmental Protection Ordinance.

Air pollution aspects of selected activities in the NWT such as industrial operations, fed-

eral government agencies, and municipalities, will be assessed.

The district office will provide support to the national program to develop atmospheric emission regulations for arsenic.

Incinerators in use in the NWT will be inventoried, monitored, and their operation assessed. An incinerator demonstration project will be planned and carried out, possibly at Rae, NWT.

A seminar will be planned for OGDs, industry and the public sector in the NWT on air pollution control.

Operation in the Yukon of the NAPS station and carbon monoxide monitoring program will be continued.

An inventory of air emissions from mining developments in the Yukon to determine if they are in compliance with the Arctic Air Emission Guidelines under the Clean Air Act will be conducted.

Federal Activities Control

Responsibilities

To clean-up existing sources of pollution from federal facilities and ensure that all new projects initiated by the federal government or under its jurisdiction are environmentally acceptable.

The cleanup program is developed in consultation with other federal departments; pollution problems are identified and assessed and an annual program based on government-wide priorities is recommended to the Treasury Board for allocation of cleanup funds to other departments.

To ensure acceptability of new projects, systems have been established for screening of projects for potential adverse environmental effects. Assistance is provided in the way of guidelines, codes of good practice and advice and recommendations provided for implementation of control actions and monitoring and surveillance as appropriate.

Review of 1976-77

The federal activities monitoring and surveillance program (prevention) was initiated in the NWT. All facilities having pollution abatement devices were visited and inspected where possible.

In the federal vessel program, an assessment study was carried out to determine the need for a vessel shore reception facility for vessel wastes at Hay River harbour. There is no current need for a separate shore reception facility at Hay River; the need for such

facilities at other locations in the NWT will be assessed this year.

An environmental inspection was conducted at most of the DEW Line stations during the summer. The survey was carried out by EPS district office staff accompanied by FSI (Felco Services Inc.) personnel. FSI is the agency which handles the operation and maintenance of the DEW Line stations. A report is being prepared.

District office staff assisted AES in the formulation of cleanup practices for spent caustic at their HAWS stations.

Proposed sites for a new solid waste dump at Resolute Bay were inspected by district office staff. (Part of the dump relocation project).

A grey water sampling program was carried out on the DPW tug *Sans Sault* operating out of Hay River harbour.

Initial Environmental Evaluations were reviewed for Rankin Inlet and Holman Island Airport expansions.

Prepared T/R for assessment studies: two NWT airports (Norman Wells and Cambridge Bay); various NCPC sites; Baker Lake and Coral Harbour fuel facilities dyking; and waste oil/fuel utilization in the NWT.

In the Yukon, plans for the Whitehorse General Hospital incinerator were prepared.

A pre-assessment study was conducted on the Watson Lake Airport.

Initial discussions were held between DFE, Parks Canada, and the Yukon Territorial Government to develop a cost-sharing formula for sewage treatment facilities at Dawson City.

An assessment of DEW Line sites in the Yukon was conducted. EPS Yukon District continued participation in the Land Use Advisory Committee. The Yukon district office participated in the testing of the Light Aircraft Camera System (LACS) developed for pollution surveillance by EPS. EPS provided assistance to the Yukon Territorial Government in preparing their Environmental Protection Ordinance.

A survey on the environmental soundness of the White Pass and Yukon Route pipeline for the Alaska-B.C. border to Whitehorse was conducted.

Plans for 1977-78

In the area of prevention, district office staff will continue to implement the monitoring and surveillance program at federal sites in the NWT utilizing pollution control facilities; will assist in the interpretation of guidelines and

the development of contingency plans, and in the consideration of DREE referrals; and will attempt to arrange, co-ordinate, and possibly undertake operator training programs.

In the cleanup program, district office staff will continue to manage the environmental assessment cleanup fund in the NWT. Inspection trips will be made to AES/HAWS in the high Arctic, and to NTCL and NCPC sites in the NWT. Assessment studies will be initiated in various areas (airports, NCPC sites, dyking vessel program continuation) and managed by district office staff. A demonstration project will be undertaken at the Yellowknife Airport by district office staff. This project will consist of setting up and operating a rotating biological contactor to handle airport wastewater at the Yellowknife terminal.

In the Yukon, a start on construction of the Whitehorse General Hospital incinerator is planned.

A pre-assessment study at Whitehorse Airport will be made. Work will continue on the sewage treatment system for Dawson City.

An assessment will be made of the waste treatment facilities at Kluane National Park headquarters in Haines Junction and the Haines Junction sewage treatment plant.

The Dew Line site report will be completed.

Assistance will be continued to the Yukon Territorial Government in the preparation of the Environmental Protection Ordinance.

There will be participation in the assessment of the Alcan pipeline proposal.

Solid Waste Management

Responsibilities

The Waste Management Branch has been assigned the responsibility, by virtue of Cabinet memoranda, for ensuring that the activities of the federal government and those activities which come under its jurisdiction are exemplary in terms of pollution control and that the federal government sets an example with respect to materials and energy conservation. In addition to this, the branch is responsible for developing new techniques and procedures for solid waste management and ensuring that information on existing and new technology is made available on a national basis so that waste management systems might be operated in the most effective manner with the least environmental impact.

Review of 1976-77

Filming started at selected communities in the Arctic for preparation of a solid waste management training film. Information and visual

material gathered will be incorporated into the film which will be used to assist settlements in the development of better waste management procedures. One training seminar was presented in Yellowknife, attended by government officers and settlement representatives. In the Yukon, the branch provided expert advice to the City of Whitehorse with respect to operational problems at the newly-developed waste disposal site. Two training seminars were presented to government officers, operators and local politicians on the subjects of waste management practices and alternative technologies.

Plans for 1977-78

Work on the training film will continue on a limited basis. It is planned to start projects concerning honey-bag alternatives and abandoned materials during the year. At least one seminar is planned for the Yukon with the possibility of others later in the fiscal year. A tour of numerous waste disposal sites within a 241 km radius of Whitehorse is planned for the summer. The tour is in response to a request from the Yukon Territorial Government for advice with respect to how existing sites might be upgraded. The concept of the training film originally planned for the NWT alone, has been expanded to include the Yukon.

Water Pollution Control

Responsibilities

To co-ordinate EPS programs with the Department of Indian Affairs and Northern Development and two territorial water boards, and ensure the development and implementation of adequate water pollution control programs in the North, as might be required to meet the objectives of the Canada Water Act and the Fisheries Act.

To implement water pollution abatement programs, including those covered by national effluent regulations.

To stimulate the development and application of water pollution control technology as it relates to the special problems of the North.

Review of 1976-77

Activities in water pollution control by EPS in the Northwest Territories focused mainly on the mining industry and on municipal effluents. A great deal of assistance was given to the NWT Water Board through its technical committee in the formulation and implementation of water licences under the Northern Inland Waters Act. Samples of effluent from all operating NWT mines were collected at least

once per year and analyzed for chemical and toxic properties, and the degree to which licensed mines had complied with their water licences was assessed. Intensive studies of the effects of Giant Yellowknife Mines Limited on Yellowknife Bay were continued, and preliminary baseline biological surveys were conducted at one gold property and at a potential lead-zinc mine.

NWT District staff participated heavily in the review of applications by several municipalities for licences to use water and dispose of wastes, chiefly in the Mackenzie Valley and southern Great Slave regions, and a brief was presented to the NWT Water Board on the application by the City of Yellowknife.

In the Yukon, the DFE response to the Yukon Territory Water Board was co-ordinated by the district office.

Three surveillance reports were completed during the year (Arctic Gold and Silver, Minto, and Clinton Creek).

The Yukon Territorial Government mosquito control program was monitored in and around Whitehorse for its effect on non-target organisms.

The Yukon River downstream of Whitehorse was studied to determine the effect of the raw sewage discharge from the city. The biological conditions downstream of Cyprus Anvil Mine were monitored. Baseline data was collected in the area of the Minto Copper property. Plans were developed for a study of mercury distribution in fish, wildlife, sediments and water in the Yukon.

Plans for 1977-78

Monitoring and surveillance activities will be continued at all NWT mines, with particular emphasis on the quality of receiving environments at Pine Point Mines, Cominco Limited Con Mine, and Nanisivik Mines. Offshore drilling in the Beaufort Sea will be the subject of additional monitoring. A preliminary baseline survey is planned for one lead-zinc property, and the effects of an abandoned gold mine on adjacent watercourses will be studied. Efforts to implement national regulations and guidelines through the NWT Water Board and its licensing mechanism will be continued, and a long-term study of Yellowknife Bay will be completed. Municipal wastewater treatment systems will be studied and selected, and the overall effectiveness of EPS program in the NWT in protecting the quality of aquatic environments will be assessed.

The Yukon office will continue its EPS work with the Yukon Territory Water Board. A study will be conducted on the distribution of

mercury in fish, wildlife, sediments and water in the Yukon.

Monitoring of biological conditions near Cyprus Anvil Mine will continue. A monitoring program will be conducted on the Yukon Territorial Government's mosquito control program.

Environmental Emergencies

Responsibilities

Environmental Emergencies' responsibilities:

- to integrate contingency planning;
- to co-ordinate the development of environmental emergency technology;
- to advise on measures to prevent environmental emergencies;
- to alert appropriate agencies and report on environmental emergencies; and
- to ensure that adequate clean-up procedures are undertaken by the polluter, or, where necessary, to initiate clean-up.

Review of 1976-77

Forty significant events were reported in the NWT, 39 of which involved spills of petroleum products, the remaining events involved a spill of mill tailings. Six of these events were investigated on site.

Assistance was given in carrying out experimental dyking studies in the Yellowknife area, and a site visit to the experimental spill of oil in the shear zone of ice on the Arctic coast was made to the Brex project, and to the development of the Beaufort Sea Contingency Plan. Sensitivity mapping of the Mackenzie Delta was completed, and a presentation was made to the Berger Inquiry. A review of the environmental assessment of the Carmar operations was carried out, and a training program in environmental emergencies was initiated.

The Yukon district office of EPS reported 27 environmental emergencies during 1976-77 and responded to 11 of the spills.

A representative of EPS was chairman of the Environmental Protection Sub-Committee of the Yukon Disaster Committee.

EPS chaired a technical team under the Environmental Protection Sub-Committee that prepared a *Contingency Plan to Deal with Petroleum and Hazardous Chemical Spills in the Yukon*.

A representative from EPS attended the BREX I exercise conducted by the Beaufort Sea Contingency Planning Task Force.

EPS participated in the DFE advisory committee to the Beaufort Sea Contingency Planning Task Force.

Plans for 1977-78

Contingency planning will be accelerated in several areas, including a review of present contingency plans submitted by various operations in the industrial sector, field visits to industrial sites, continued involvement in the Beaufort Sea Contingency Plan, and particularly, in the initiation of development of a government contingency plan to deal with oil and hazardous chemical spills in the NWT. A 24-hour telephone number for the reporting of spills and other environmental emergencies will also be instituted.

Involvement in the Arctic oil spill countermeasures program is envisaged, through participation and observation at the field level. Recommendations will be made in regard to countermeasures for offshore drilling permits, land use permits and other authorities.

Further efforts in regard to the dyking of petroleum storage facilities will be made, through participation in the northern dyking technical committee, by regular visits to the experimental dyking project in Yellowknife, and through liaison with northern operators and other government agencies. The first draft of northern dyking guidelines will be prepared.

A review of the available literature on petroleum and petroleum dispersants will be made with particular reference to northern conditions and biology. Responses to spill events will be upgraded by co-ordinating spill reporting, providing on-site inspections of major events, and by documenting all major spills in order to identify effects, and select preventative and remedial measures.

Technology Development

Responsibilities

The Northern Technology Centre was established in the summer of 1975 in Edmonton as a focal point within EPS for technology development relating to water pollution control in northern regions.

Review of 1976-77

The centre was host to the symposium on utilities delivery in Arctic regions. An evaluation of extended aeration plants in the North was made.

The centre conducted a review of self-contained toilet systems and a prototype compost toilet suitable for use in the North was developed.

The centre participated in the development of a computer-based decision-making tool on

water and sanitation levels of service in northern communities.

There was an evaluation of the rotating biological contactor as a treatment systems for dilute, low-temperature municipal wastewater.

Screening and ozone disinfection for dilute, low-temperature wastewater as a total treatment method was evaluated.

An annual annotated bibliography on northern environmental engineering was published.

Instrumentation and thermal analysis of buried utilities in cold regions including permafrost conditions was conducted.

The centre collaborated with other agencies on the production of a utilities delivery design manual for cold regions.

There was an evaluation of wastewater lagoons in northern areas.

With the assistance of the Yukon office, a pilot plant sewage treatment trailer at Whitehorse was set up. The process involved the use of a rotating biological disc, a rotostrainer and ozonation for sewage treatment in cold climates. Co-operation on this project will continue.

Plans for 1977-78

Contract studies will be made on viruses in wastewater. There will be development of greywater treatment and disposal systems, as well as effective treatment and disposal of concentrated human waste.

Fisheries and Marine Service

Responsibilities

Activities of the Fisheries and Marine Service involve overall responsibility for fisheries research and operations throughout Canada and for the implementation of oceanographic and hydrographic programs of the federal government. Specific responsibilities in the North concern:

- maintenance and development of fish and marine mammal stocks and assessment of the impact of future development on these stocks;
- upgrading commercial fishing practices and carrying out physical and chemical studies of processing plants;
- assessing inventories and characteristics of angling stocks and monitoring recreational fishing activities;
- carrying out physical and chemical studies of the arctic marine environment on such matters as tidal characteristics, wave regimes, pollutants and the properties and distribution of ices; and

hydrographic and resource studies of northern waters and the publication and maintenance of up-to-date nautical charts, tide tables, etc. of the region.

Arctic Biological Station, Ste. Anne de Bellevue, Québec

Responsibilities

Biological investigation of the marine environment in Canada's North, especially the distribution and abundance of marine mammals and fishes, the ecological factors that control production and the reactions of plants and animals to environmental stress.

Review of 1976-77

Marine Mammals

During March and early April 1976, work continued in the Holman area, western Victoria Island, on the population dynamics and birth habitat of the ringed seal. Specimens were collected from Inuit hunters, and plane-table maps were made of birth lairs in the ice of Prince Albert Sound.

From mid April to early June a party of three men, using two snowmobiles, travelled from Holman to Resolute, surveying the number of ringed seal birth lairs in the area of the proposed arctic pipeline marine crossing in M'Clintock Channel, Barrow Strait and Peel Sound.

From mid-August to freeze-up in early October, the netting onsite at Brown's Harbour on Cape Parry was used as part of a continuing mark-recapture program to study the movements of ringed seals. Several surprising recoveries of seals have been made, the furthest coming from eastern Siberia.

Studies of narwhals, sampled from the Inuit hunt, were continued in Lancaster Sound. For the first time a large number of the samples came from the early summer hunt at the edge of the fast ice, these animals giving the best information so far on feeding. Another new feature was a month-long watch carried out in early summer from a clifftop at Cape Hay, northern Bylot Island, paralleling a study done 19 years earlier at the same site by ornithologist Dr. L.M. Tuck. The survey allowed comparison of number of passing narwhals and bowhead whales, with observations also on harp seals, walruses and bearded seals.

A two-week study of the estuarine concentrations of white whales in the Mackenzie River estuary in relation to developing oil

traffic, was again carried out, and some observations were made of bowhead whales.

Surveys from an Argus long-range patrol plane in Davis Strait located a group of whelping hooded seals during late March. For the first time a series of photographs was taken, although the survey did not succeed in covering all seals seen.

Biological Oceanography

Studies were continued at the government laboratory at Inuvik on the activity of marine bacteria and their ability to degrade oil. The physiological responses of selected marine invertebrates from Herschel Island to normal environmental stress were also examined, as well as their ability to tolerate oil. Studies of marine bacteria were resumed in Frobisher, and experiments were carried out on the effects of crude oils, dispersants and several heavy metals on phytoplankton. Further data were obtained on the cryoflora, the layer of microscopic plants growing on the undersurface of sea ice in late winter and spring, which forms the base of a very important food chain.

Marine Fishes

Studies in the western Arctic in July and August were conducted from *M.V. Salvelinus* working out of Tuktoyaktuk Harbour. Fishing consisted almost exclusively of trawling with a small balloon trawl in Tuktoyaktuk Harbour and Kugmallit Bay until 25 July, and in Liverpool Bay until 30 August. Trawling in Kugmallit Bay was done randomly to obtain an estimate of the numbers of smelt (*Osmerus eperlanus*) and burbot (*Lota lota*) in Mackenzie plume water. In Liverpool Bay it was done on a grid pattern to delineate species distribution, composition and abundance. Processing and analysis of material and data have not been completed, but field observations confirmed the existence of large numbers of smelt and burbot in Kugmallit Bay and large itinerant schools of other species in Liverpool Bay.

Plans for 1977-78

Further studies on the distribution of ringed seals and the density of birth lairs will be made in Prince Albert Sound, western Victoria Island in the spring. In the summer, studies will concentrate on determining the role played by the polar cod in the feeding of ringed seals, while in the fall migrant animals will be captured in nets at Brown's Harbour, Cape Parry, and marked for studies of migration. Other live specimens will be transported

to the University of Guelph for further studies on bio-energetics.

Under the Arctic Islands Pipeline Program, an analysis of satellite photographs and observations from aerial surveys will be made to show the relation between marine mammal distribution and ice conditions. Field observations will also be made of the distribution of white whales in the areas of pipeline crossing in Barrow Strait and about Somerset Island.

Further observations will be made on the numbers and behaviour of the population of walruses at Coats Island and Southampton Island in northern Hudson Bay, using ground observers and aerial survey, and collections will be made from *M.V. Calanus* of the bottom living invertebrates utilised as food by walruses.

Additional information on the distribution and abundance of marine fishes in the Baillie Islands area in western Amundsen Gulf will be obtained.

Physiological studies on marine bacteria and several important invertebrates will continue at Inuvik and Frobisher, and preliminary microbiological work will be undertaken in Davis Strait in connection with offshore drilling. Anticipating further work in this area, a small laboratory and house will be erected at Brevoort Island.

Much modification of the above plans will be made if the Eastern Arctic Marine Environmental Study (EAMES), sponsored by DIAND, receives approval from the Treasury Board.

Canadian Hydrographic Service

Responsibilities

The Canadian Hydrographic Service carries out hydrographic surveys in northern waters; and produces and distributes nautical charts, sailing directions, tide tables and reports based on survey activities and other sources.

Review of 1976-77

Pacific Region's *C.S.S. Parizeau* suffered ice damage off Point Barrow and was unable to undertake its proposed program in Amundsen Gulf. On the Athabasca-Mackenzie waterway, the main task of the chartered vessel *Radium Express*, was a survey of the navigation channel through Eskimo Lakes. Revisions were carried out along the length of the Mackenzie River. The survey of Mackenzie Bay was completed and new surveys were conducted in Kitiqasuit Bay and in Hay River.

Three winter projects were conducted in

Northern Canada by hydrographers from the Canada Centre for Inland Waters at Burlington, Ontario. The Polar Shelf survey included possible shipping routes and pipeline crossings in Penny Strait and Belcher Channel. In James Bay, the winter survey of bathymetry and geophysical parameters was completed. An evaluation program for a tracked vehicle equipped to sound through ice was carried out, with the Polar Gas camp at Rea Point on Melville Island as a base of operations.

The offshore multiparameter survey of Hudson Bay continued, again using the Transport Canada vessel *Narwhal*. Inshore surveys were also carried out at Povungnituk. In James Bay, the areas at the outlets of the Attawapiskat and Albany rivers were surveyed.

In the Eastern Arctic, hydrographers from Bedford Institute of Oceanography assigned to CCGS *Labrador* undertook surveys south of Bathurst Island and Austin Channel, and in Allen Bay and Freeman's Cove, while C.S.S. *Baffin* continued route surveys in Foxe Basin.

Plans for 1977-78

In the Western Arctic, multiparameter surveys will be carried out in Amundsen Gulf and new surveys and revisions will be undertaken on the Mackenzie-Athabasca system.

Winter surveys will be carried out in Viscount Melville Sound and in the Belcher Islands area of Hudson Bay.

The *Narwhal* will continue to be used for the multiparameter survey of offshore Hudson Bay during the summer. Hudson Bay coastal surveys will include Whale Cove, Eskimo Point and Povungnituk.

In the Eastern Arctic and sub-Arctic, main areas of concentration will be Victoria Strait and a route through Austin Channel to Cameron Island. Surveys are tentatively planned at various possible beaching sites in the Arctic Islands. Route surveys are tentatively planned for Wellington Channel to Penny Strait, an alternate project being the western part of Jones Sound.

Freshwater Institute — Winnipeg, Manitoba

Fisheries Resources

Review of 1976-77

Research activities centered around a detailed study of Arctic char on the Kent Peninsula, NWT. The objective of this study is to provide details on the population dynamics, production capacity and life history of this

species which is important in the domestic, sports and commercial fisheries of the territories. The information obtained is of prime importance in the planning of new strategies and improved management techniques. As part of the program a large number of char were tagged on their seaward migration in June and again on their return from the sea in August and early September. Tagging and tag recoveries were facilitated by the use of a counting fence. A survey of the char in eight lakes on Victoria Island was also conducted.

Fisheries Management activities included the on-going creel census and biological sampling program on the lake trout sport fisheries of Great Bear and Great Slave Lakes. The objective is to determine the results of reduced catch and possession limits imposed during 1974 in terms of harvest, and also to determine the general population dynamics of the game fish species (lake trout and Arctic grayling) in order to assess the effects of the sport fishery.

Sport fishery assessment also included monitoring and sampling the Arctic char fisheries at the Tree and Sylvia Grinnell rivers, the grayling fishery at Kakisa River and the walleye fishery at Mosquito Creek. Commercial fisheries work included monitoring of the fisheries at Great Slave Lake, Cambridge Bay, Nettilling Lake and the Keewatin Coast. Assessments of the anadromous Arctic char were carried out on selected streams along the Keewatin coast and at Nettilling Lake, Baffin Island, using counting fences and tagging in order to obtain the necessary biological information to set quotas for the commercial fisheries in those areas. This information is also complementary to the research work being conducted on the Kent Peninsula. A preliminary assessment of the inconnu population in the Great Slave — Buffalo Lakes area was also initiated.

Plans for 1977-78

A new fisheries management scheme will be implemented in 1977 on the Great Slave Lake commercial fishery whereby the minimum gillnet mesh size will be reduced. The whitefish populations will be closely monitored to assess the effect of this regulation. Quotas will be adjusted accordingly until the optimum level of exploitation is attained. The investigations of the lake trout sport fisheries at Great Bear and Great Slave Lakes will be continued. The Arctic char fishery at the Sylvia Grinnell River will be monitored to assess the long-term changes in the fish population due to exploitation. Assessment of the char

population on the Keewatin coast and Baffin Island will be continued, as will the inconnu study on Great Slave — Buffalo Lakes. The Arctic char project on the Kent Peninsula will also be in operation this year.

Environmental Impact Section

Review of 1976-77

Aquatic resource survey information was collected in the vicinity of Arvik Mine, Little Cornwallis Island and monitoring studies of metal levels in marine biota were continued in the Strathcona Sound — Admiralty Inlet area in order to monitor the impact resulting from the development of Nanisivik Mine.

Land use survey mapping studies were continued for the fisheries resource of the NWT. Banks Island and the Coppermine area were surveyed this year.

Engineering planning studies were continued to modify existing fish passage designs or develop new ones for regional fish species.

Biological surveys were continued along the proposed E. Arctic Pipeline route with a view to developing a capability to review the proponent's impact assessment.

Case history studies were continued at three stream crossings of the Mackenzie Highway in the vicinity of Fort Simpson, NWT. These studies are intended to monitor both the short and long term effects of highway culvert crossings on aquatic resources of small streams in the Mackenzie Valley. These small tributaries are believed to provide important spawning and feeding areas for resident fish of the Mackenzie River. It is hoped that the study will identify culvert construction techniques which are most damaging to aquatic resources.

Fisheries resource studies were conducted on the Upper Snare River, NWT to define the resource potentially affected by hydroelectric schemes in the area.

Fisheries and limnological studies were completed at Stanwell-Fletcher Lake, NWT to obtain baseline limnological information on a large high Arctic lake. This information was compared with other lakes (Char Lake) to provide some general baseline upon which to impose anticipated impacts to such lakes.

Plans for 1977-78

Experimental environmental impact research studies will be conducted north of Chesterfield Inlet, NWT to:

study stream productivity and its importance to Arctic char fry;

determine experimentally the effects of methane addition to an ice bound freshwater lake on the biota; study the biology of some aquatic invertebrates, important fish food sources; and determine the swimming performance (burst and sustained) speeds of Arctic char in order to design fish passage facilities.

Inventories of all stream crossings by roads in the NWT will be conducted to ascertain if they are blocking fish passage. The Mackenzie Highway monitoring study will also be continued.

The land use mapping survey will be continued to cover the Bathurst Inlet — Contwoyo Lake area.

Certain design modifications to culvert baffles will be tested on a pilot scale in Winnipeg and further hydrological studies will be conducted on the Redknife River to enable designing a full scale weir at the Redknife River.

Arctic Island Pipeline studies will continue in the Murchison River area. A review of all biological resource information in the Mackenzie Delta will be performed with a view to establishing a long term resource inventory program in the area.

Further studies of the fisheries resource in the Snare River will be conducted with a view to a long term monitoring of fish populations in the river system to determine the effects of hydroelectric development on the river.

Reports on the living aquatic resources of the Great Bear River and Strathcona Sound will be completed.

Arctic char resource usage, coastal distribution and migratory studies will be conducted along the S.E. shore of Baffin Island to provide background information on this resource in view of impending hydrocarbon exploration off the coast.

Industry Services Branch

Responsibilities

The Industry Services Branch is responsible for:

- monitoring and standardizing of plants to ensure construction, equipment and operating regulations are followed;
- technical assistance in handling, processing, transportation, storage and distribution of fish and fish products;
- laboratory analysis of domestic and imported products, plant sanitary surveys, water and ice samples;
- inspection of freshwater species to ensure

- market acceptance of domestic and exported fish and fish products;
- inspection of fishing vessels for voluntary compliance to equipment and operating standards;
- assistance to industry towards cost of constructing and modifying commercial fishing vessels under the national Fishing Vessel Assistance Plan; and
- administration of ice-making or ice-storage facilities under the national Fish Chilling Assistance Plan.

Review of 1976-77

Registration was undertaken of processing establishments in the NWT (there are presently six registered processing plants, one registered cannery and numerous non-registered packing plants).

Collection and analysis of end-of-line samples, water and ice samples was continued and in-plant sanitary surveys, and analyses for *T. crassus* determinations were made.

Training courses were established at various locations for primary commercial fishermen and industry management personnel.

Studies were conducted on parasite infestation in whitefish/tullibee samples from NWT to obtain current information for inclusion in the Whitefish Classification Manual. Staff also carried out sample collection for contamination analysis on freshwater species.

Hay River office assisted with development of grade standards for fresh, frozen, canned, and packaged fish and fishery products in order to establish baseline data on present quality levels from boats, planes, vehicles and retail outlets. Construction of a mobile fish plant was completed.

Plans for 1977-78

The Branch plans to:

- carry out experiments designed by Industry Services with prototype fishing vessel in northern locations;
- conduct design and specification studies on mobile fish processing plant developed by Industry Services to determine application in remote areas;
- test prototype of mobile fish plant in northern Saskatchewan;
- undertake a project whereby quotas are removed from small fly-in lakes; lakes are fished to their economic limit rather than biological limit, then declared moratorium till fish populations return. Objective is to reduce the numbers of lakes fishermen must fly-in, while still maintaining a reasonable annual catch;

- undertake a project to find fish under ice utilizing sonar;
- become more involved, where applicable, in vessel insurance and subsidy programs; and
- maintain routine surveillance of plants and products in NWT.

Ocean and Aquatic Sciences

Oceanography

Review of 1976-77

Physical and chemical oceanographers from the Bedford Institute of Oceanography (BIO) conducted investigations in the Labrador Sea toward the end of the winter cooling period, February through April, 1976, from the research vessel *CSS Hudson*. The Labrador Sea is of prime interest to Canadian oceanographers not only because of its importance as a producer of deep water masses, but also because of its influence through the Labrador Current on the oceanography of continental shelves to the south. In particular, the experiments were designed to investigate the structure of the offshore branch of the Labrador Current. Throughout 1976-77, analysis of the data has continued, together with analysis of other data from previous work in the area of BIO.

In August, 1976, during a cruise of *CSS Hudson*, both CTD (conductivity-temperature-depth) measurements and bottle casts were run on two sections across Lancaster Sound at 82° and 91°W. The latter sections repeated a run by the University of Washington in 1973 which had suggested that Bering Sea water flows through the Arctic Archipelago, and out of the Arctic. Unfortunately, the most southerly stations could not be reoccupied because of ice conditions.

In the spring of 1976, members of OAS, Atlantic Region, again participated in the Arctic Ice Dynamics Joint Experiment (AIDJEX) in the Beaufort Sea and measured momentum and heat fluxes over drifting sea ice. The objectives were to obtain a data set for the development of models for ice movement and pressure ridging. Measurements were also obtained on the 'form drag' associated with ice ridge formation.

The search for oil and gas along the Canadian Atlantic coast has expanded to the Labrador continental shelf. Since 1971, an increasing number of exploratory drillings have been made with enough success to warrant a northward trend in further exploration. This development has prompted a review of BIO of

all available environmental information on this region, which will be published.

Various aspects of the OAS, Atlantic Region marine geodesy program are relevant to the North. Since 1968 the region has been using the Transit satellite navigation system for positioning research and survey vessels. This system requires networks of fixed stations. Midway between a fixed geodetic network and a network of marine stations (such as oceanographic vessels and offshore drilling rigs, some of which may be moving), lie the slowly deforming networks such as the manned ice camps of AIDJEX. During the past two years the region, in collaboration with AIDJEX investigators, has critically examined the problems of determining the absolute and relative motions of these ice camps using the Transit system. In other work, a series of experiments was designed and field work carried out to acquire radar altimetry data over Hudson Bay and the Scotian Shelf during transit by NASA's GOES-3 satellite. This data is being analysed and will be used to provide an improved ocean geoid (mean sea-level surface).

During the summer of 1976, OAS Central Region (Burlington) carried out a physical oceanographic study in the northern portion of James Bay and in the southern portion of the Hudson Bay arc between the Belcher Islands and the mainland:

to provide further pre-project baseline data (Complex La Grande); and
to trace the outflow of James Bay fresh water and ascertain its trajectory around the Belcher Islands.

A second program involving current meter deployment and detailed STD transects in the entrance to Hudson Bay was thwarted due to engine failure on the charter ship Petrel. The objective of this program was to determine the water mass transport between Hudson Bay and Hudson Strait.

In the winter of 1976-77, the third consecutive year of through-the-ice physical oceanographic measurements were carried out in conjunction with ongoing hydrographic and gravity surveys in James and Hudson Bays. This year the study was concentrated in the Hudson Bay arc in the same area as the summer program:

to collect pre-project baseline data (Grande Baleine Complex); and
to study the dynamics of the freshwater plume under an ice cover and compare it to the higher discharge plume of the La Grande River.

In the high Arctic, a helicopter-borne physi-

cal oceanographic study was carried out in Penny Strait in April, 1976 to obtain a preliminary indication of the amplitude and variability of the water mass transport.

The Beaufort Sea Project was an arctic marine environmental assessment program financed jointly by the federal government and 18 member companies of the Arctic Petroleum Operators Association. While field studies ended in September 1975, there remain seven technical reports outstanding of a total 46 technical reports expected. Six overview reports, designed for the interested layman, are in preparation. So far, about 15 000 copies of technical reports have been distributed. Wave-rider buoys were deployed in the co-operative study with Imperial Oil, Canadian Marine Drilling Ltd. and DFE's Marine Environmental Data Services. Locations of interest were off Kugmallit Bay, Pullen Island, Garry Island, Warren Point and from a Canadian drillship.

Arising from the Beaufort Sea Project, a further study has been made of atmospheric pollution arising from a burnoff of an arctic oil spill; additional work on the albedo change associated with the surface contamination of the snow/ice surface by oil has also been carried out.

In response to an urgent concern regarding mercury levels in the North, Ocean Chemistry conducted a crash program to analyse the plankton, fish and surface sediment samples collected during the 1975 Beaufort Sea cruise, and accelerated processing of shipboard data on seawater mercury levels. Seawater and surface sediment in the southern Beaufort Sea were found to have values of mercury lower than any reported in the literature, averaging about 11 ng./l of seawater and about 67 ng/g dry weight of surface sediments.

The sedimentation rate in Southern Beaufort Sea was studied using lead-210 dating technique; results indicated a very low rate near the Mackenzie River Delta area and a maximum rate in the eastern part of the inner shelf. Another program on the analysis of cadmium in surface sediment and mercury content in the particulates in sea water is being carried out.

Field and laboratory studies focussed on the Canadian Arctic archipelago and to a lesser extent on the Beaufort Sea. These studies were mainly marine environmental research related to petroleum development and possible oil spills and their effects.

The main Arctic study in 1976 related to the possibility of oil spills from tankers, marine

pipelines or underwater oilwell blowouts in the vicinity of recent oil strikes on Cameron Island by Panarctic Oils Ltd. Ice movements in Byam and Austin Channels were tracked using radar during August and September; concurrent satellite imagery and surface wind measurements provide supplemental information on general ice drifts in the region.

The porosity of multi-year sea ice was studied from early to late summer to throw some light on the permeability of old sea ice to oil trapped beneath it. Three sets of data, obtained under various freezing and thawing conditions, showed that the porosity of the surface layer increased with thawing while the ice in contact with the sea became more porous as the ice warmed to sea temperature at the end of summer.

In October, an environmental review of the proposed marine drilling by Norlands Petroleum Ltd. in Lancaster Sound was initiated. The review is to be completed by August, 1977 and will consider the possible impact of a deep water oil well blowout on the biota of Lancaster Sound.

In connection with the environmental review and the study carried out in Byam and Austin Channels, two complementary studies are underway. The first is a review of the oceanography of the Arctic archipelago using all available data, to understand the surface, sub-surface and ice movements in the channels of the archipelago by tracing water masses and wherever possible inferring geostrophic currents. The second study is of ice movement patterns as they relate to oil-spill trajectories, primarily in the Sverdrup Islands and Parry Channel. Landsat and NOAA satellite imagery provides sequential observation of ice floes and ice edges.

From November 1975 to late March 1976, a camp was occupied in the shear zone of the southern Beaufort Sea from which oceanographic, meteorological and ice movement observations were carried out. Ice reconnaissance using aircraft extended to July 1976.

During February, 1976, an oceanographic survey was conducted in the Greely Fiord area (80.2°N) which culminated in a tracked vehicle journey from the base on d'Iberville Fiord to Eureka. The vehicles and sledges used were then shipped to Resolute by aircraft for current meter installations in Byam and Austin Channels. The meters were placed near the sea bed to acquire information on forces likely to act on bottom structures such as pipeline crossings, and just below the ice/water interface to estimate the potential for pollutant transport.

Rupture of ice sheets by gas accumulated at the ice/water interface as an accompaniment to an oil well blowout has been studied. Further analysis of data from the oil well blowout simulation conducted in Patricia Bay, B.C. in January, 1975, is being carried out. This has shown that the similarity solution normally applicable to buoyant jets may not be used for a "bubbler" system of this magnitude.

To plan recovery of bottom current meters from beneath the sea ice, a study has been made of mooring systems to predict the depression and horizontal movement suffered by sub-surface floats marking the current meter locations when dragged by local currents acting on the mooring line.

Considerable efforts have been expended to build a sensor chain which, through simultaneous measurements of temperature and conductivity, will yield salinity. Laboratory experiments are encouraging, and first field tests are anticipated early in 1977.

The main effort in Ocean Chemistry programs was analysis of samples of seawater, sediments and marine organisms collected during the "Pandora II" cruise in southern Beaufort Sea last year, and production of reports both on baseline levels of hydrocarbons in the southern Beaufort Sea, and distribution of tar and other particulate pollutants along the Beaufort Sea coast and offshore islands.

Surveys of the Beaufort Sea coast of Mackenzie Bay, the western portion of the Tuktoyaktuk Peninsula, the Yukon coast and offshore islands of the Mackenzie River delta again indicated a very clean environment with respect to tar pollution. No natural seepage was evident, although some isolated occurrences of asphalt near Drift Point and grease near Shingle Point and around Raft Point and Warren Point were encountered. Plastic wastes, in particular explosive cannister fragments originating from marine seismic activities, were prevalent and were found to have again inundated beaches that were cleaned up during the 1975 survey.

The Ocean Technology Division continued to be involved with interpretation of the signatures obtained for sea ice with various remote sensing tools. Scientific guidance and some financial support was given to a small winter oceanographic program at Pond Inlet. OAS also supported the final year of the Northwater Project.

Plans for 1977-78

Two BIO cruises will be made to the Labrador Sea. The first, during October/November, will be primarily concerned with the Labrador Current and its variability. Strings of current meters will be moored on the shelf and slope, CTD surveys will be undertaken, and other experiments carried out. Then, from January through April these current meters will be replaced (to remain in position until the fall of 1978), additional meters will be placed in West Greenland Current. Further studies of the dynamics of deep convection will be made in the Labrador Sea, using vertical current meters (neutrally buoyant floats).

Almost no chemical oceanographic studies have been done in the eastern Canadian Arctic. During August/September, 1977, a BIO cruise is to be undertaken to learn more about the region from a chemical point of view and to gather information that will be required as economic development occurs. Areas of interest for the cruise include: open water areas (Northern Baffin Bay, Smith Sound, east end of Jones Sound, Somerset Island/Resolute Bay area); regions of possible chemical transport (through the Arctic Archipelago (Lancaster Sound, Kane Basin-Smith Sound, Baffin Bay-Davis Strait); and regions of possible high productivity (Northern Baffin Bay, near Prince Leopold Island). Water samples will be collected at standard depths and sediment grab samples obtained, both for a variety of analyses. Altogether some 57 stations will be occupied.

Hydrographic surveys from BIO to the North in 1977 will include coastal charting off Labrador and natural resource charting of the Labrador Shelf and Sea, both from the charter vessel *Martin Karlsen*. *CSS Baffin* will be working on route surveys, either in Victoria Strait or Ungava Bay. Farther north, it is hoped to be able to undertake a route survey between Bathurst Island (Cape Cockburn) and Cameron Island from a Transport Canada ice-breaker. A similar study is being carried out in April, 1977, in Prince of Wales Strait.

In summer of 1977, field work will concentrate on the eastern end of Parry Channel, primarily in Lancaster Sound. Four current meter moorings are to be placed during the summer in the deep water of Lancaster Sound north of Borden Peninsula. Installation and recovery will be done from a DOT ice-breaker inbound and then outbound from the Archipelago. To track breakup patterns of sea ice in Barrow Strait and Crozier Channel, two radar sites will be occupied in early summer.

To monitor surface water movements in Lancaster Sound not discernible from satellite imagery, 10 drifting buoys will be set out at stages in the summer in the ice-free waters. Their positions will be monitored by the U.S. Nimbus satellite system. The latter two studies are part of the Arctic Marine Oilspill Program.

A cruise is being planned to conduct a baseline study on the *Pandora II* under a hydrographic survey program in the Amundsen Gulf area. Sea water, marine organisms and surface sediments will be collected from studies of trace metals and hydrocarbons in the area. Chemical oceanographic data of temperature, salinity, oxygen and nutrients will be collected at the same time to identify water masses, and to assess nutrient levels, essential for an assessment of productivity in that area.

Staff will participate in the "Early Arctic Probe" by the *CCGS Louis St. Laurent*, May/June 1977 to extend previous research on the performance of vessels in various ice conditions. Interpretation of sea ice data obtained by remote sensing continues to be a priority study.

Planning and Finance Service

The Planning and Finance Service provides a variety of support facilities for the line Services of Fisheries and Environment Canada including information, computing management services and personnel. The responsibilities of at least one of its directorates however have some direct relevance to the North.

Liaison and Co-ordination Directorate

Responsibilities

This directorate co-ordinates environmental and renewable resource activities of a multi-service nature in negotiations or conferences involving other departments of the federal government, provincial governments, governments of other countries, and international organizations. For other departments, governments and agencies, it serves as a central point of contact within the Department of Fisheries and the Environment, and provides the contact point to facilitate the conduct of new or ongoing activities. It collaborates with other services of the department to assist in formulating broad policy.

The directorate's activities are generally national or international in scope, but there are specific responsibilities related to the

North, particularly that of assisting services representing DFE on the various committees of the ACND. There are also northern aspects to a number of environmental issues raised in bilateral and international discussions, including activities which involve the United States.

The Unesco Program on Man and Biosphere (MAB), is a co-ordinated and integrated interdisciplinary research program designed to examine specific problems with a view to identifying potential public policy alternatives. The Secretariat for the Canadian MAB program is centred in the Liaison and Co-ordination Directorate.

As part of the Canadian response to the MAB program, one of four sub-programs under development deals with the question of technological change and industrial development in the Arctic, sub-Arctic and other isolated regions and the consequential impact on social and cultural patterns, environmental quality, and wildlife productivity. A research framework for MAB activities in the North has been prepared and published as Canada/MAB Report 8: Science for the North. A discussion paper *Ethical Principles for the Conduct of Research in the North* was also prepared and is available as communiqué number 6. A possible outcome of the Canada/MAB Report 8 is the preparation of an atlas of Northern Canada under the "umbrella" of the Royal Society of Canada.

Office of the Science Advisor

Responsibilities

To provide advice on science related policies and the effectiveness of scientific activities of the department.

To study the need for an application of scientific and technical information, as it relates to the environment and the use of renewable resources, in the industrial and social activities of Canadians.

To explore and develop new techniques for obtaining and relating scientific knowledge of the environment and its effect on human activities.

To indicate possible consequences of natural and/or man-caused changes and influences in the Canadian and world environment, and their potential effects on resources use, prosperity, and way of life.

To communicate and co-ordinate information on the environment and resource use, and to relate such information to programs and responsibilities of the department.

Review of 1976-77

In 1976, the Office of Science Advisor undertook the following activities with specific northern or arctic content:

identification of potential projects in the fields of atmospheric science, hydrology, marine and aquatic biology, oceanography, and ecosystems studies that might be pursued under the Canada-USSR General Exchanges Agreement; provided environmental comment on the ACND statement on Guidelines for Scientific Activities in Northern Canada; provided liaison and co-ordination for discussion of Canadian interests in proposed or on-going multi-national polar research programs in fields of heat exchange, ice dynamics, marine geophysics, arctic tectonics studies, environmental vulnerability studies, etc.; and contributed to information on the effects of energy activities on the environment of northern Canada, as part of the analysis of energy policies for Canada.

Plans for 1977-78

Preparation of an identified plan for northern science thrusts in environmental studies.

Continued co-ordination and analysis of science and technology programs related to the environment in northern Canada and polar regions.

Department of Indian Affairs and Northern Development (DIAND)

Northern Program

Northern Policy Directorate

Responsibilities

The Northern Policy Directorate is responsible for analyzing and advising on policy related to the department's responsibilities in the North. This includes:

- examining major selected issues and proposing policy positions;
- reviewing the government's national objectives and priorities in the North and advising on their interpretation and modification and means of attaining them;
- the collection, interpretation and publication of data on the annual northern expenditure plans of federal and territorial government, government departments and agencies;
- the compilation of statistics relating to the social impact of government activities in the North; and
- the co-ordination of the Northern Program's activities relating to native and claims and the development of policy.

Review of 1976-77

The Northern Policy Directorate, was established during 1976-77.

Data on the northern expenditures and employment of the federal and territorial governments for the period 1973-74 to the 1976-77 were published in the *Annual Northern Expenditure Plan 1976-77*. The publication displays aggregate expenditure and employment information by the reporting agency and various categories of expenditure, including an allocation of expenditures to the national objectives for the North. Detailed expenditure and employment data for each departmental program are included with a description of the program objective. Other categories of information include: expenditure data by economic function, object of expenditure, location of responsibility centre, and location of principal benefit. Employment data by location is also provided. The survey to collect data for the 1977-78 Annual Northern Expenditure Plan was completed in March, 1977.

Northern Co-ordination and Social Development Branch

Territorial Relations Division

Responsibilities

To act on behalf of the Department of Indian Affairs and Northern Development in the negotiation and administration of federal-territorial financial agreements with both territories.

To review fiscal and legislative policies and development plans for both the Yukon and Northwest Territories and to advise the deputy minister on matters relating to the administration of the territories.

To co-ordinate the work of the Department of Indian Affairs and Northern Development and the governments of the Yukon Territory and the Northwest Territories in all federal matters not related to natural resources.

To advise the commissioners of the Yukon and Northwest Territories on matters of government administration in the territories.

To co-ordinate the transfer of provincial-type services under the jurisdiction of the federal government to the governments of the Yukon Territory and the Northwest Territories.

To co-ordinate arrangements between the territorial governments and other departments and agencies of the federal government on matters affecting areas of territorial government responsibility.

Review of 1976-77

The Territorial Relations Division continued to observe and assess the effects of the major amendments made to the Yukon and Northwest Territories Acts in 1974. Those amendments increased the size of the Yukon Council from seven to 12 members and the first Council of 12 was elected in November 1974. The Northwest Territories Council became a wholly-elected body of 15 members and the first Council of 15 was elected in March 1975, a majority of whom were native.

The amendments to the two territorial acts were complemented by other constitutional changes providing, (most recently) for the selection of a third elected member to the Executive Committee in the Northwest Territories as of December 1, 1976 and the transfer of responsibility for several additional departments of the territorial government to elected members of the Yukon Executive Committee as of January 1977. In each of the territories, the three elected members are chosen by Council and formally appointed to the Executive Committee by the Commissioner. Their

duties include the assumption of responsibility for the administration of one or more departments of the territorial government, the provision of advice to the Commissioner in the performance of his overall function as chief executive officer of the territory responsible for the administration of the territorial government, the provision of advice to him in respect of the legislative program to be presented to territorial Council, and the presentation and defence of the program in debates before Council.

In keeping with the government's objective of furthering the evolution of self government in the northern territories, a gradual transfer of provincial-type functions performed by various federal departments and agencies in the North to both the Yukon and the Northwest Territories governments has taken place over the past number of years. Most recently, agreement in principle has been reached to transfer to the territorial governments, as soon as is practicable (i) responsibility for federally administered health care delivery programs; (ii) administrative responsibility for the holding of elections to each territorial council; and (iii) authority for territorial officials to handle prosecutions in cases of alleged violations of territorial ordinances. Both territorial governments are considering enacting their own income tax ordinances and initiatives to seek complementary amendments to the federal Income Tax Act are in progress. Approval has been given to an immediate transfer of responsibility for the NWT section of the Small Business Loan Fund to the Northwest Territories Government.

Financial assistance for the governments of the Yukon Territory and the Northwest Territories was appropriated in 1976-77 in the following amounts:

Financial Agreements

YT		
Operating grant	\$ 10,924,000	
Grant-in-lieu of income taxes	9,241,000	
Capital grant	11,606,000	
Loans	5,250,000	
NWT		
Operating grant	109,856,000	
Grant-in-lieu of income taxes	14,479,000	
Capital grant	41,000,000	
Loans	5,720,000	
<i>Additional Financial Assistance (Contributions) outside the Agreements</i>		
YT		
Hospital care of Indians	\$ 212,000	
Medicare for Indians	146,000	
Low Income rental- purchase housing	193,000	
NWT		
Hospital care of Indians	3,411,000	
Medicare for Indians and Eskimos	620,000	

The division co-ordinated the negotiations for Federal-Territorial Financial Agreements to begin April 1, 1976 for both territories.

Plans for 1977-78

The financial agreements which begin April 1, 1977, for both territories, provide for assistance in the following amounts:

YT		
Operating grant	\$ 15,951,000	
Grant-in-lieu of income taxes	13,361,000	
Capital grants	11,606,000	
Loans	5,100,000	
NWT		
Operating grant	\$106,835,000	
Grant-in-lieu of income taxes	27,517,000	
Capital grants	49,092,000	
Loans	5,700,000	

Social and Cultural Development Division**Responsibilities**

The Social and Cultural Development Division co-ordinates the administration of certain programs for Inuit and other northern residents, either on behalf of the Government of the Northwest Territories or representing residual federal responsibilities.

The division comprises the following sections: the Native Liaison Section, the Eskimo Art Section, the Culture and Linguistic Section, and the Special Services Section.

The Native Liaison Section is responsible for establishing and maintaining a line of communication with northern native associations in all issues of concern. The section administers and monitors funding for land claims research and development, and facilitates the process of consultation and involvement with northern natives in matters related to northern development.

The Eskimo Art Section promotes Inuit art by preparing interpretive exhibits from the department's collection of Inuit arts and crafts for circulation to museums, universities and other institutions in Canada and abroad. It also provides specialist advice and assistance to the public on matters relating to Inuit art. Assistance is provided to Canadian Arctic Producers Limited and *La Fédération des Co-opératives du Nouveau-Québec*, the central marketing agencies for northern arts and

crafts, in the development of new products, and to the Canadian Eskimo Arts Council in the implementation of its recommendations. Artists are encouraged to protect their copyright. Infringements by southern manufacturers are discouraged through legal means.

The Culture and Linguistic Section provides a translation service in major dialects of the Eskimo Language, and publishes a quarterly Eskimo magazine entitled *Inuititutut*. It also administers a grants scheme for the preservation and furtherance of the Eskimo culture and language. This section sponsors Eskimo language films, assists in the publication of Eskimo literature, organizes cross-cultural conferences and acts on behalf of the department in relation to the activities of the Inuit Cultural Institute and other Eskimo cultural associations.

The Special Services Section provides specialist advice on various matters relating to Inuit and northern natives generally. It is also responsible for the Eskimo Loan Fund and associated financial assistance schemes, Canadian Reindeer Limited, and participates in the deliberations of the Federal-Provincial Committee on Financial Assistance to Indians and Eskimos of Labrador.

Review of 1976-77

Continued funding of the claims activities of the northern native associations was sustained largely through the provision of loans repayable from the proceeds of claims settlements. The proposal for a land claims settlement submitted earlier by Inuit Tapiripat of Canada was withdrawn for reconsideration by the association. During the year the Inuit Tapiripat developed a revised proposal through close consultation with the Inuit in the NWT. A three volume report documenting Inuit land use and occupancy in the NWT was published by the department in September 1976. In October, the Indian Brotherhood of the NWT presented a proposed agreement-in-principle for the settlement of Dené land claims. The Métis Association of the NWT has been given funding for developing a proposal for submission in July 1977. The Western Arctic Inuit proposed a regional land claim and support was given to the Committee for Original Peoples Entitlement, the western affiliate of Inuit Tapiripat. In March 1977, the Labrador Inuit Association submitted a statement of their right to submit a claim. Close consultation is maintained with these groups in moving toward the settlement of claims.

Several native associations testified before the Mackenzie Valley Pipeline Inquiry. The

division administered the funds made available by the federal government for these appearances. Informal discussions on northern resource development and other issues were held with representatives of northern native associations.

Two major exhibitions of Inuit art circulated internationally during 1976-77, "We Lived by Animals", an exhibit of prints and carvings introduced Inuit art to German and Italian audiences and a retrospective exhibition of drawings by Pitseolak, prepared in co-operation with the West Baffin Eskimo Co-operative, circulated in the United States as part of Canada's contribution to U.S. Bicentennial celebrations. Assistance was given to the Art Gallery of Ontario to present an exhibition featuring eight artists from Baker Lake.

An exhibition of art depicting Inuit Games circulated to cultural centres in Québec during Olympic year is currently touring Ontario under the auspices of the Art Gallery of Ontario. A competition was held to promote jewelry-making from native materials with 44 pieces being chosen by a jury for exhibition. An art conference/carving competition organized by the Canadian Eskimo Arts Council was held in Frobisher in April in conjunction with a Council meeting. Through the division, the department contributed both to the financial support and planning of the Ontario Science Centre's Native Heritage Exhibition in Toronto during the summer of 1976. In addition, the Eskimo Art Section displayed at the centre an exhibit of original graphics and sculptures depicting many aspects of Inuit technology.

The Inuit Language Commission, instituted in 1974 to gather information on the use of the Eskimo language in Canada and to determine the wishes of the Inuit with regard to orthography, completed its survey under the auspices of the Inuit Cultural Institute throughout the six major dialect areas of the North in 1976. Based on the results of this survey two writing systems, one in syllabics and the other in Roman letters were developed by the Commission and ratified in Frobisher NWT, during September 1976 by delegates of the Inuit associations, governments and churches. Implementation of the orthographies is beginning.

During the year, a syllabic character typewriter element designed to improve and facilitate production of written material in the Eskimo language was acquired. This element has been tested and, as a result, a number of changes and modifications will be made before it is available for general distribution.

At this time, the additional characters devised by the Inuit Language Commission will be included to make the element orthographically complete.

Four issues of the department's Eskimo language magazine *Inuttituut* were published during the year reflecting the varying dialects of the Inuit. The issues examined topics relevant to the Inuit such as co-operatives, education, language and communication, and tourism. In addition to the four major issues, a bulletin was also published which offered facts and program information about the Native Associations of Canada's Inuit.

In co-operation with the National Film Board the division continued its support of Inuit film and video-tape production chiefly through the Nunatsiakmiut film workshop in Frobisher which produces material in the Eskimo language for broadcast on the CBC Northern Service television network. Support was also extended to individual Inuit film makers.

Throughout the year, the department provided 18 cultural grants to Eskimo individuals, groups and organizations requiring assistance in achieving and retaining their cultural identity within the framework of the Canadian way of life. For example, Inuit artists were encouraged to attend major exhibitions of their works, research material for the preparation of books, and participate in cross-cultural conferences.

The Eskimo Loan Fund was increased to \$5.3 million. As of March 31, 1977 a total of 83 loans having a value of \$1 220 383 were made to Eskimos. In addition, \$689 713 was paid out in economic development contributions.

To reduce demands on the Eskimo Loan Fund and to encourage the participation of banks in the expanding economy of the North, the government guaranteed some \$3 million in working capital loans made by banks to such organizations as the Inuit Development Corporation, the Canadian Arctic Co-operative Federation and *La Fédération des Co-opératives du Nouveau-Québec*.

A comprehensive review of the northern co-operative system was completed. The review indicated that the co-operatives made an important contribution to the social and economic development of northern people, but collectively faced working capital and managerial problems. Approval was obtained for a five-year multi-million dollar development program to provide technical, managerial and financial assistance to the Eskimo co-operatives of the NWT and Arctic Québec.

Plans for 1977-78

The division expects to expand its function of consultation and liaison with the northern native associations. Loan agreements will be administered in connection with land claims research and development activities of the associations. Funds will be made available to facilitate the process of consultation between the government and native people in matters of northern development. Selected Inuit artists will be provided with photo portfolios of their works in public and private collections. A retrospective exhibition of Inuit prints will be prepared and circulated in co-operation with the National Museum of Man. A pilot project on the conservation and cataloguing of Inuit graphic art will be carried out in Cape Dorset, in co-operation with the West Baffin Eskimo Co-operative, under the direction of the Conservation Division of Historic Sites and Parks Branch.

In keeping with the government's policy of multi-culturalism and established policies related to northern development, the division will continue to support the development of Eskimo culture and language, either directly or in collaboration with the Inuit Cultural Institute.

The division will co-ordinate the implementation of a five-year co-operative development program in the NWT and Arctic Québec. Recognizing the demands for loans from the Eskimo Loan Fund for new businesses, as well as for co-operatives, for inventory and refinancing purposes, the fund is being increased to \$6 100 000 the associated contributions and bank loan guarantees will also be substantially increased.

Northern Social Research Division

Responsibilities

The responsibilities of the Northern Social Research Division are to:

- plan, conduct and sponsor research principally in the social sciences;
- encourage and support northern research by non-government agencies through the northern scientific training grants program;
- develop and maintain a northern research and documentation service;
- interpret research findings for program application;
- assist the territorial governments with the co-ordination of research activities in the North; and to
- operate the Inuvik and Igloolik northern sci-

scientific resource centres, and make plans for additional resource centres.

Review of 1976-77

Northern research continued with an emphasis on work related to problems of social change for native people in the North, in particular in the fields of education, linguistics, socio-legal research and northern demography. A large portion of this research was done by university scientists and others working under contract for the division, whose officers supervised and co-ordinated these research projects:

Inuit Legal Acculturation

Research directed towards the development of a Legal Information and Education Program in the Northwest Territories Perceptions and Expectations of the School System in two communities in the Northwest Territories

Athapaskan Language Study

Northern Demography

Theories of Land Tenure and Ownership with particular reference to the Canadian North

Nutritional Analysis of non-commercial foods eaten by Canadian Inuit and Indians Comparative Analysis of Social Studies in the field of Northern Communications

Comparison and Analysis of minority group images in the mass media, with particular reference to Canadian Inuit and Indians Continuation of the study of the Effects of Television on Northern Children

Social and Economic Effects of the Eastern Arctic Pipeline on northern communities.

During the year, the division's analysis capacity was expanded so that research findings could be more effectively translated into policy proposals and communicated to program managers. A Northern Research Information and Documentation Service was created to collect, process, store and disseminate information on northern scientific research. This will provide a single source of information to the federal, territorial and provincial governments, universities, native associations and industry, and provide improved communications between groups and individuals engaged in northern research.

The Northern Social Research Committee, which was set up to advise the division and the program on priorities in northern social research and help bridge the gap between scientists and managers, met twice during 1976-77; in Frobisher in September and in Yellowknife in December 1976. The committee is chaired by the branch director and its

membership is drawn from the territorial governments, native organizations, the academic community and this department.

The division participated in the Arctic Islands Pipeline Research Program, under the departmental pipeline co-ordinator, and community studies of Spence Bay and Resolute Bay were carried out in conjunction with the Government of the NWT and the two communities. The community studies were carried out by Polar Gas.

In 1976-77, the 15th year of the Northern Scientific Training Grants Program, amounts totalling \$350 000 were awarded, as recommended by a grants committee. Through these grants, a large number of northern research projects were supported in a wide variety of scientific disciplines. Grants were made to:

Groupe de Recherches nordiques (Université de Montréal).

Boreal Institute (University of Alberta)

Centre d'Etudes Nordiques (Université Laval)

Committee on Arctic and Alpine Research (University of British Columbia)

Committee on Northern Studies (University of Manitoba)

Institute for Northern Studies (University of Saskatchewan)

Institute of Social and Economic Research (Memorial University)

Centre for Northern Studies and Research (McGill University)

Committee for Arctic and Sub-Arctic Research (University of Toronto)

Northern Research Group (University of Ottawa)

Northern Research Committee (University of Western Ontario)

Centre de recherches sur le Moyen-Nord (Université du Québec à Chicoutimi)

Presidential Committee on Northern Studies (McMaster University)

Ecole Polytechnique (Université de Montréal)

Committee on Northern Studies (York University)

An additional \$75 000 was awarded in 1976-77 to Canadian universities to support specified research into northern problems identified by government.

The division continued to operate the Northern Scientific Resource Centre at Inuvik. This laboratory, which opened in 1963, provided general laboratory and other facilities to support research in a variety of scientific disciplines in the Mackenzie Delta Region. The Northern Scientific Resource Centre at Igloolik, opened in the summer of 1975, continued its support of scientific research in the Eastern Arctic. Preliminary pre-planning was carried out during the year for a third centre in Whitehorse to serve the Yukon area, and consideration was given to the consolidation of scientific facilities in Yellowknife and Resolute Bay.

Plans for 1977-78

The division will continue to sponsor and carry out research programs directed mainly towards the social questions of northern Canada and the potential social impact of large resource developments on the people of the North.

The Circumpolar Unit will collect scientific data, analyze and provide advice on scientific and policy matters concerned with the Circumpolar North.

The Research Information and Documentation Service will catalogue all material on current research being done in the department, as well as in other federal departments and agencies, plus research undertaken by the territorial and provincial governments, native associations, universities and industry, and disseminate this information by newsletter.

The Grants Program will continue in 1977-78 to support a wide range of northern research.

Planning for further scientific facilities in the North will continue with emphasis on the northern scientific resource centre planned for Whitehorse, followed by other centres at Yellowknife and Resolute Bay.

ACND Secretariat Division

The Secretariat provides a supportive service to the eight principal committees that constitute the basic structure of the Advisory Committee on Northern Development (ACND). These committees are: Policy Committee, General Committee, Committee on Transportation, Committee on Science and Technology, Committee on Communications, Committee on the Employment of Native Northerners, Federal-Territorial Economic Planning Committee and the Advisory Committee on Industrial Benefits from National Resource Development.

Within the territories, the co-ordination of program-related activities is accomplished under the aegis of the Federal Interdepartmental Co-ordinating Committee in the Yukon, and the NWT Co-ordinating Committee in the Northwest Territories.

In addition, working and task groups are formed, as necessary, to examine specific areas of committee concern or to develop positions or policies on issues not directly within the purview of one or another of the principal committees.

The committee structure provides an ongoing mechanism for interdepartmental consultation on policies, program planning and activities that pertain or may be applied to the objectives of government in northern Canada.

Briefly, the more salient activities of the ACND in 1976-77 were:

emphasis on creation of employment opportunities for native northerners in the northern public service sector; examination of improvements and extensions to multimodal forms of transportation in the North;

the development of principles for the DREE-type approach to economic development;

the continuing scrutiny of major resource development activities in northern Canada to ensure maximum financial and technical benefit to Canada;

the development and promulgation of guidelines with respect to federally conducted or sponsored scientific activities in the North and planning for extension of scientific support facilities; and

the reporting of federal activities in the North, through publication of *Government Activities in the North 1976-77*.

Northern Operations Branch

Responsibilities

The Northern Operations Branch is responsible for the development of short- and long-term operation plans to implement the National Objectives in the North relating to resource development and environmental protection. It is also responsible for the implementation of the departmental northern employment and training programs and their co-ordination with the NWT Government.

The Branch ensures the effectiveness of field operations and identifies the need for new or revised policy initiatives. It co-ordinates requests for the regional resources required to fulfill legislative and regulatory mandates and directs the development of operational directives and procedures necessary to effectively implement resource development programs. Co-ordination is maintained with regional offices, federal departments, agencies and governments, to ensure operational re-

quirements are reflected in new policies or programs. The Branch assesses the impact of new developments on the operational capabilities of the regions.

Special Projects Division

Strathcona Sound Project

In accordance with an agreement between the Government of Canada and Mineral Resource International, subsequently assigned to Nanisivik Mines Ltd., the government is to provide infrastructure facilities such as a wharf, an airport, roads and a townsite in conjunction with the NWT Government. The estimated cost for the construction of these facilities is \$18 335 million, of which an estimated \$10 million is recoverable. In return for assistance to the project, the federal government has an 18 per cent equity in Nanisivik.

The mining company is to provide training and apprenticeship positions for northern residents; undertake comprehensive environmental studies; maximum usage of Canadian services, materials and equipment; give preference to Canadian-built, Canadian flag shipping services for inbound and outbound shipping; consult with companies and governments within Canada to ensure efficient processing of the mine's concentrates within Canada.

With the exception of the construction of the wharf which started in the spring of 1975, the construction of all the other infrastructure facilities began in 1974. The airport is 60 per cent complete and in use. The wharf is 98 per cent complete, the roads are completed to rough grade and are in use, and the townsite is 85 per cent complete.

Underground mining started in July 1976 and by early February 1977 commercial production of 1524 t/day was achieved.

Northern Business Preference

In 1975, a task force made up of five northern entrepreneurs was created by the former DI-AND Minister, the Honourable Judd Buchanan, to study problems encountered by northern businessmen in obtaining federal contracts. It submitted 42 recommendations to improve the competitive position of these businessmen.

With the exception of the recommendation dealing with bid depository, which is under

review, action in one form or another has been taken on all recommendations.

Training and Employment Liaison Division

Responsibilities

The Vocational Education Section is responsible for providing counselling services on request for northern students in southern Canada, and for arranging relocation to employment in southern Canada. A training on-the-job program for native northerners is administered by the section, as well as a summer employment program.

The Employment Liaison Section maintains contact with all potential employers in the resource development industries in the North, federal departments and agencies, territorial governments and trade unions to ensure that the native northern residents have every opportunity to share in, and benefit from, the development of the North. The work covers the development of special employment programs, the negotiation of specific agreements and their subsequent monitoring and the encouragement of employment opportunities for native northerners.

Review of 1976-77

The Employment Liaison Section continued to monitor native employment, especially related to highway and oil industry activities. Mean native employment on Mackenzie Highway construction and in oil industry activities was 50 per cent. Other employment agreements were monitored and studies undertaken to consider the potential impact of large-scale development projects.

Work continues at various levels of study to attempt to solve native employment and retention problems.

The Northern Careers Program developed in the section is now operational through a unit of the Public Service Commission located in Yellowknife. The program is designed to guide native people into full-time jobs in the federal public service at the middle management level.

Education and training programs were arranged for more than 250 northern natives to study in southern universities, colleges, and technical and high school programs. Permanent counselling units were maintained in Ottawa and Winnipeg, and part-time counsellors were engaged in other locations as required.

The on-the-job training program operated to the full capacity of the program's finances.



Summer shoreline at Broughton Island

More than 180 northern natives were working as trainees, with emphasis on placing trainees with the Northern Affairs Programs in the NWT and Yukon. More than 80 per cent of the trainees completing their training have been placed in permanent positions.

Under the supervision of an instructor northern native trainees carried out the construction of new houses for the department at Resolute Bay and Igloolik.

Plans for 1977-78

The negotiation of training and employment agreements will continue with industries establishing operations in the North, with special emphasis on mining and petroleum companies, to ensure maximum participation of native people in the development of the North.

Work will continue to foster the increased concern of the mining industry in employing native people through mining industry committees located in Yellowknife and Whitehorse. Research and studies will continue into problems related to native employment.

The on-the-job training program will be developed to the extent that resources permit. Native trainees, under the supervision of an instructor, will carry out construction for the department in the Northwest Territories at Franks Channel and Rankin Inlet.

Northern Economic Planning Branch

Regional Planning Division

Responsibilities

The division works with the territorial governments in the preparation of regional development plans, co-ordinates departmental and other federal inputs to such plans, develops programs to foster regional development and undertakes or sponsors studies required to carry out these activities and to determine the regional impact of development projects in the North.

Review of 1976-77

The main thrusts of the Regional Planning Division were to complete arrangements for the introduction of DREE-type programs in the North and to complete a pipeline contingency plan for the Mackenzie Delta Region. Cabinet approval for a DREE-type General Development Agreement was obtained during the year and work began on agreements with both territorial governments. In addition to co-ordinating federal inputs to the Mackenzie Delta planning efforts, the division contributed directly to the land use and demographic components. The division also carried out an analysis of the effects which pipeline construction would have on the NWT economy and contributed to discussions in the Northern Program concerning land use policy for the North.

Plans for 1977-78

The major thrusts for the division are expected to be:

- finalization and signing of General Development Agreements with both territorial governments;
- under the General Development Agreement with the Yukon Government, begin work on a development strategy for the territory;
- begin work with the Government of the NWT on a regional development strategy for the Liard Region so that the people of that area can gain maximum benefit from the Liard Highway when it is completed;
- prepare regional planning projects related to possible pipeline developments in the Eastern Arctic and the Southern Yukon; and
- work with the Government of the NWT to prepare pipeline contingency plans for the middle and south Mackenzie areas.

Economic Analysis Division

Responsibilities

To provide advice to senior officials and to the minister on northern development strategies, policies and plans. To perform economic analyses of resource development projects, aspects of energy and mineral policies, transportation and communications policies and projects, aspects of the native economy, and programs and projects of crown corporations and government investments under departmental jurisdiction, taking into account national and departmental objectives and policies.

Review of 1976-77

The Resources Section acted as the Secretariat to the Chairman of the Interdepartmental Task Force on Electrical Energy Costs in the North. The section also prepared an in-depth analysis of electrical power rates and levels of consumption of domestic consumers in the territories as well as a comparison to rates, consumption and billings in other parts of Canada. Various alternatives for alleviating increased power rates with their likely costs were analyzed and presented to the task force. The report of the task force with its recommendations was released by the minister on December 16, 1976.

The consulting firm of Underwood, McLelland and Associates was retained to study the use of petroleum by-products from future gas processing plants in the Mackenzie Delta region. It is hoped that these liquid hydro-carbons could be a ready and economic source of energy for northern residents. The consulting firm has completed its work and a draft report is now being studied by the section.

The section continued to co-ordinate the interdepartmental studies relating to the Arvik Mines Project. The company was advised of the general conditions which would have to be satisfied as the basis of a formal agreement to bring the property into production and to export concentrates for a specified period of time.

A report was prepared in the section on the future operation and the past performance of the Clinton Creek Mine of Cassiar Asbestos Corp. Ltd. The company data were examined at the property and at the head office in Vancouver. The report supports the conclusions of the company regarding the ending of the mining operations in 1978.

An assessment was made of the economic feasibility of marketing the production from a barite deposit in the Yukon. The assessment

supported a request for cost sharing assistance under the Initial Access Road Program. In connection with another application under the same program a similar evaluation was made to analyze the social and economic consequences related to a lead-zinc deposit in the Yukon.

The section participated in the work of a group under the pipeline co-ordinator to decide on baseline studies on the impact of the proposed Alcan pipeline. Suggestions were drawn up for study projects which would be significant from the resource development point of view.

The Transportation Section worked with an interdepartmental working group including Yukon Government officials in developing a strategy for future Yukon rail developments. At the request of the working group, studies on the impact of a smelter on Yukon railway development and the effect on the Yukon road system was completed.

Transportation studies relating to the Mackenzie Delta regional plan were completed, as well as the study of trucking costs in the Yukon. Cost-benefit studies of the proposed Liard highway and the Jean-Marie River road were carried out.

The Program Development Section developed at the beginning of 1977 into the Corporate Economic Analysis Section. The section during 1976-77 performed analysis of the mining royalty schedules and other provisions proposed in the Yukon Minerals Bill. Also a study summarizing the recent activities of Alaska Regional Native Corporation was prepared; the section was also involved in evaluating the fiscal aspects of the Nunavut Land Claims proposals submitted in 1976.

The study, a report on the Public Sector Involvement in the Mineral Industry was received and is being reviewed. The section also contributed to the preparation of the Report of the Task Force on Electrical Energy Costs in the North. The design of the study of the Social Impact of the Nanisivik Mines Ltd. which is being undertaken by the Baffin Region Inuit Association was supported by the section during the year. A report on the cost overruns and financial implications of the Nanisivik Mines was prepared. The development of a computerized Cash Flow Model was initiated. Among other activities the section wound up the Crown involvement in Panarctic Oils by signing over the purchased shares to Petro Canada; and took on the role of monitoring and advising on Crown interests in northern corporations.

Plans for 1977-78

The Resources Section expects to be further involved in the studying of concepts involving total energy requirements in the territories. Regarding the high rates for electric power in the North, suggestions for more relief to consumers are to be developed. The feasibility of a zinc-lead smelter in the Yukon is being further investigated and in particular an evaluation is being made of the economic conditions under which either a custom smelter or an integrated company smelter would be viable. Studies are being pursued on the social and economic impact of recent oil and gas developments as well as the related plans for bringing these energy materials to market.

The Transportation Section in conjunction with the interdepartmental committee will complete the development of a strategy for further Yukon rail developments. Transportation studies relating to the South and Central Mackenzie Contingency Plan will be carried out. A study will be conducted on the alternatives to the present system of carrying out the resupply of the Great Bear River and Lake region.

The Corporate-Economic Analysis Section plans to continue the development of the Computerized Cash Flow Model, analysis of financial considerations for N.C.P.C., and the detailed analysis of major mines operating in the northern territories. The section also will be involved with the economic analysis and study of the implications of the Native Land Claims issues and proposals, and oil and gas royalties. Also proposed is the beginning of general economic reporting of the North, as well as more detailed work on the Yukon economy.

Northern Roads and Airstrips Division

Responsibilities

The division has overall program and policy responsibility for construction and maintenance of roads in the North with emphasis on socio-economic, technical and environmental aspects.

Mackenzie Highway

Due to escalating construction costs and a change of priority, it has been decided to stop construction of the Mackenzie Highway at Mile 425 (south of Wrigley). Hire North, currently working on the section 411-425, is expected to finish by September 1977. Watsko Garage will finish grading of Mile 314-343 by

October. Thus by autumn, it is probable that construction of the Mackenzie will cease.

Hire North

Hire North, an agency of the Government of the NWT was formed in 1972 with the intention of giving training and employment to native people on the Mackenzie Highway Construction Project. Since its inception, Hire North has trained over 130 heavy equipment operators and has provided jobs for approximately 1300 people, cleared 3000 acres of right-of-way, constructed over 26 km (16 mi.) of the highway. It is intended that Hire North continue Mackenzie Highway construction to Mile 425 by September, 1977. A management trainee program is being developed. An alternative training and construction area will soon have to be found, unless permission is obtained from the people of Wrigley to construct up to Wrigley, Mile 440 (alternative site would be Liard Highway or Jean Marie River).

Dene Mat Construction Limited

Dene Mat Construction was formed in January, 1974 as a subsidiary of the Fort Simpson Co-operative. Co-op membership is approximately 98 per cent native, about 80 per cent of that membership treaty Indians. Dene Mat construction is owned 51 per cent by the Fort Simpson Band and 49 per cent by Mr. Matichuk, the company manager. The operation of the company is guided by a Board of Directors composed of representatives of the Band and Mr. Matichuk.

In 1971-72, Dene Mat received through a combination of open tender and negotiations, 11 contracts totalling \$815 529. During 1975-76, Dene Mat was awarded four contracts amounting to \$1 310 782. For this current fiscal year, this company has received one contract on the Mackenzie Highway (Willow Lake rock cut) valued at \$259 740. This combined total of contracts since this company's inception has amounted to \$2 386 051. Currently, the Dene Mat Construction Company is planning to unite with Cree-Chip Construction Company of Fort Chipewyan to form a larger third construction company with access to Fort MacMurray and Mackenzie Valley Pipeline contracts (should this proceed).

Yukon Native Construction Company

In early March, 1977, YANSI expressed the desire of its members for increased participation in highway construction. With the minister's support, a proposal for the formation of a Yukon Native Construction Company was prepared in August by the Indian and Eskimo

Program in co-ordination with the Northern Program, YANSI, YNB, and CYI: requesting departmental financial assistance.

In January 1977, the Yukon Native Construction Company was officially amalgamated and a project manager was hired to provide the company with the necessary technical and managerial expertise.

On March 24, 1977, the minister approved a contribution agreement for \$60 000 (\$30 000 funded by Northern Program and \$30 000 funded by Indian-Eskimo Program) to pay for the company's project manager for one year, and associated administrative cost. To date, the company has bid on the contract for the Dempster Highway — washout and repairs, but was unsuccessful; however, their bid was a reasonable one, being in the middle of bids received.

On April 22, 1977, the Yukon Native Construction Company held their first annual meeting at which time a board of eight directors was elected and a final constitution agreed upon.

Dempster Highway

From Mile 0 just south of Dawson the system stretches 671 km (417 miles) to a point where it joins the Mackenzie Highway some 53 km (33 miles) south of Inuvik. When complete this all weather road network between the Mackenzie River Delta communities and Dawson will be the first all weather direct link between the Yukon and the NWT.

It will also provide a low cost alternative to seasonal barge traffic.

In 1973-74 a contract was awarded to Wiley Oilfields Hauling Ltd./Norm Keglovic Construction Ltd. joint venture, for construction of a section from Mile 178 to Mile 237. This section of the highway, estimated to cost \$7 100 000, was scheduled for completion in 1974-75. However, because of adverse conditions and the use of shale rock to replace ordinary borrow materials in the subgrade this project was not completed until 1976-77.

Construction of the Eagle River Bridge by DND will be completed ahead of schedule in June 1977.

Bids have been received as of April 11, 1977 for construction of Miles 268-290. DWP has prepared a submission awarding the contract to Watsko Garage.

The last contract for Miles 254-268 will be tendered in May. In mid-1974, a contract was awarded to Keen Industries Ltd. for the construction of the subgrade from Mile 290 (Yukon Territory/Northwest Territories border) to mile 344 (Fort McPherson).

By January, 1977, the rough grade had been completed and the contractor was on upgrading, trimming and clean up.

The highway is complete from Mile 344 to Inuvik with the exception of the ferry at Arctic Red River. Krutko Enterprises Limited is working on the ferry approaches at ARR. Completion is scheduled for spring 1977. The Dempster Highway will be completed in 1979.

Carcross/Skagway Road

The road is complete to Mile 66 but Miles 35 to 50 need reconstruction. Miles 66-85 (B.C. Alaska Border) are under construction by General Enterprises and scheduled for completion in 1978. The US section will be completed in 1977.

Liard Highway

Approval is being sought for the construction of the Liard Highway in the context of a regional development plan.

Cost-Sharing Roads

Provision is made in the Northern Roads Program for cost-shared roads required for exploration or development purposes. Assistance is available for the construction of low standard (tote trails), medium-standard (initial access roads), and high-standard (permanent access roads) to approved resource development projects. The Tote Trail Program was expanded to allow for other transportation modes which in some instances may be less expensive or more appropriate, including low standard airstrips, small docks, helicopter landing pads and seaplane bases. This program, which has been renamed, "Northern Exploration Facilities Program", will be administered by the governments of the Yukon and Northwest Territories. Assistance under this program may be up to 50 per cent of the cost of construction but will not exceed \$30 000 to any one recipient.

Financial assistance for bridge and access road construction to date amounts to \$2 478 125.

During 1976, two applications were received from Yukon Barite Co. for the construction of an initial access road, 10 km (6.4 mi.) in length which will link the mine site to the North Carol Road at Mile Post 254 in the Yukon. The estimated cost of construction is \$43 000 for a possible contribution of \$21 500.

Canex Placer Limited

Canex Placer Ltd. for the construction of an initial access road approximately 80 km (50

miles) from the Nahanni Range Road at Mile Post 116 to their Howard's Pass Lead-Zinc property in the Northwest Territories. The estimated cost of construction is \$1 625 000 for a possible contribution of \$500 000.

Northern Mineral Exploration Assistance Program

Since the inception of the program in 1966, 241 applications have been approved and a total of \$5 269 196, has been paid in grants.

Due to the government's fiscal restraints, the Northern Mineral Exploration Assistance Program has not received additional funding in 1976-77. Accordingly, no new application for assistance under the program have been accepted since December 31, 1975.

Data Management Division

Responsibilities

The division is responsible for developing, in conjunction with territorial governments and Statistics Canada, the systems necessary to produce regular and consistent macro-economic and manpower statistics, e.g. unemployment rates, labour force data, price indices, measures of Gross Territorial Product and supporting economic accounts; and for providing statistical data and quantitative analysis for northern economic planning.

Review of 1976-77

The preparation of a set of economic accounts for each of the territories to provide yearly estimates of Gross Territorial Product for the years 1967 to 1974 inclusive constituted the major effort of the division. The government sector and business sector were completed.

A feasibility study on the use of the survey approach to obtain labour force data in the Yukon Territory was completed. A Yukon socio-economic data inventory was compiled. A survey and analysis of past and current pricing surveys in the territories was completed, and planning began for further northern price work.

Quantitative analysis of resource development and demographic matters was undertaken.

Plans for 1977-78

The major thrusts of the division's work will be in the following areas:

complete the preparation of Economic Accounts for the period 1967 to 1974 inclusive;
conduct limited labour force survey tests in the Yukon Territory;

subject to availability of funding, complete the planning necessary to conduct a family expenditure survey in the territories during 1978-79;

improve and significantly expand statistical data available from the division's Statistical Information Centre;

prepare manpower and labour force supply and demand projections for each territory; and

supply statistical data for economic planning purposes, and conduct quantitative analysis as necessary to support the Northern Economic Planning Branch.

Pipeline Co-ordination Division

Responsibilities

The Northern Affairs Program reorganization brought about the creation of the Pipeline Co-ordination Division, formerly part of the now defunct Policy & Planning ACND Division. The division has the responsibility to co-ordinate, administer and analyze activities relating to northern pipeline proposals. The division is also responsible for the departmental co-ordination and representation pertaining to the Environmental Social Program.

Review of 1976-77

A departmental research program related to northern pipeline development in the Eastern Arctic was continued under the Environmental-Social Program while a similar program was initiated for the Alaska Highway corridor.

Liaison was maintained with other government departments, industry, academic and independent institutions on pipeline matters.

Pipeline developments and proposals for pipelines in the Canadian North were monitored.

Administrative responsibilities continued in connection with the Mackenzie Valley Pipeline Inquiry. Summaries of the proceedings and other information concerning the Inquiry were distributed to government departments, agencies and public interest groups.

Plans for 1977-78

To establish appropriate research programs related to northern hydro-carbon development.

To continue co-ordination of an active departmental pipeline research program in the Eastern Arctic and in the Alaska Highway corridor. To support procedures related to processing pipeline applications.

To monitor pipeline developments in Alaska and proposals for pipelines in the Canadian North.

To continue to maintain liaison with other government departments, agencies, industry, academic and independent institutions on pipeline matters.

To complete co-ordination duties and liaison with the Mackenzie Valley Pipeline Inquiry and to continue to provide information regarding the findings of the Inquiry.

To establish, co-ordinate and administer a departmental socio-economic inquiry into the Alaska Highway pipeline proposal.

To support preparation of departmental terms and conditions to be applied to granting of a pipeline right-of-way in the North.

To monitor Liquified Natural Gas (LNG) developments and the proposals for transporting LNG from the Arctic Islands by tanker.

Northern Environmental Protection and Renewable Resources Branch

Environment Division

Responsibilities

The Environment Division is responsible for environmental review and assessment of major resource development projects in the territories and is the main link between the department and the Federal Environmental Assessment and Review Process (EARP). Draft terms and conditions are prepared for other parts of the department for incorporation in Land Tenure Agreements, permits, licences, etc. Environmental studies are carried out for the development of more effective regulation of land use activities.

Review of 1976-77

Environmental Assessment Section

The principle task of the Environmental Assessment Section was the Mackenzie Delta Gas Gathering Assessment. The Environmental Impact Assessment of Imperial Oil Ltd.'s Taglu Gas Plant and an executive summary including recommendations was prepared for review by the Federal Environmental Assessment and Review Process as the first project the department has submitted. Work began on the preparation of similar documents dealing with the other two gas-plants: Parsons Lake (Gulf) and Niglntgak (Shell).

The section was instrumental in the development of the Eastern Arctic Marine Environmental Study (EAMES) by assisting in the establishment of work criteria, the evaluation and collation of proposals and by liaising with Eastern Arctic communities and industry. Specialists from other government departments, notably Department of Fisheries and Environment, Department of Energy, Mines and Resources and NWT Government have made major contributions to the program development.

Liaison and information exchange has taken place with the Ministry of Greenland regarding environmental impacts of mining developments in the Arctic and concerning environmental studies associated with Greenland offshore oil and gas exploratory drilling.

The section has been instrumental in drawing up terms of reference for, and the management of, environmental studies associated with hydrocarbon and mineral development, and the development of the Environmental Impact Study Guidelines. The section has further provided advice concerning environmental aspects of hydrocarbon, mineral exploration and development, and granular resource and water utilization.

Environmental Studies Section

Research projects on the response of northern vegetation to fire, the toxicity of arsenic and cyanide to fish, and an evaluation of terrain sensitivity photomosaics were completed.

Thirty updated maps of the Land-Use Information Map Series were published and progress was made on the preparation of additional sheets.

Monitoring of oil spill sites continued and the fourth volume of the *Ecological Bibliography of the Arctic Island Archipelago* was published.

New projects included: an evaluation of the use of sumps to dispose of drilling fluids; a bibliographic review of the state-of-the-art and new field experiments on mine waste reclamation; the impact of seismic surveys on small furbearers and a study of the development capacity of northern lakes with particular emphasis on problems related to cottage developments.

Eight reports were published or are in press on the basis of studies funded by the section.

Environmental Engineering Section

Six environmental monitoring studies were continued along the Mackenzie Highway to

collect environmental baseline data. Results will be used to assess the environmental impact of the Highway.

Environmental assessments of the design of parts of the Mackenzie and Dempster highways, the proposed Liard Highway and new mining access roads were carried out. Recommendations were made in efforts to minimize the environmental problems on the highways.

Plans for 1977-78

The Environmental Impact Assessments of the proposed gas plants at Taglu, Parsons Lake and Niglintgak will be completed. The division will be involved in environmental assessments of the proposed Alcan and Polar Gas pipeline and in the assessment of pilot projects to develop gas fields in the Arctic Islands. Liaison and information exchange will continue with the Ministry of Greenland concerning drilling in the offshore waters between Canada and Greenland. The current environmental studies program will continue with particular focus on the evaluation of the use of sumps for the disposal of drilling fluids. Work will continue on the Liard and proposed Inuvik-Tuk Highway alignment with environmental baseline studies being carried out on the Liard Highway. A general overview of environmental baseline information with respect to the Inuvik-Tuk Highway will be assembled and assessed.

Water Resources Division

Responsibilities

To conserve and manage the inland water resources of the Yukon and Northwest Territories, the Arctic sea waters adjacent to the mainland and islands of the Canadian Arctic, and to protect these waters from environmental damage.

The division controls the use of land and waters for hydro power developments on federal lands south of the 60th parallel. These responsibilities are carried out under the Northern Inland Waters Act, the Arctic Waters Pollution Prevention Act and the Dominion Water Power Act.

Review of 1976-77

During the year the water resources staff was active with the water licensing program under the Northern Inland Waters Act and Regulations. Approximately 340 applications to use water were received and 337 authorizations and 16 licences were issued; six licences for hydro power purposes, five for municipal

water use; three for mining purposes; and two for water storage. A large mining development at Strathcona Sound, NWT, was licensed during the year while two other mines were prosecuted for not complying with all the terms and conditions of their water licences.

Through the Arctic Waters Advisory Committee, environmental and surveillance activities were conducted in connection with offshore oil and gas exploratory drilling. The highlight of this program was the beginning of offshore drilling in the Beaufort Sea.

The division staff continued to collect water and land rentals for the eight hydro power developments licensed under the Dominion Water Power Act. Inspections of the developments in Alberta were carried out and consultations began for the renewal of several of the licences.

Representation was provided by the division on many interdepartmental, international, federal-provincial and industry-related working groups. The staff participated in the development of mining effluent guidelines, contingency plans for chemical and oil spills, water quality criteria and initial planning for a Mackenzie Basin Study.

The division carried out numerous studies and investigations on various aspects of water uses which included river engineering, hydrologic and drainage studies, sediment surveys and a preliminary survey of the Bathurst Inlet area in the NWT. Advice was provided in matters pertaining to pipelines, oil and mineral development, community water supply and waste disposal systems. Through a cost sharing agreement with the Department of Fisheries and Environment, the water quantity survey network was expanded with two new stations in the Yukon and six in the NWT.

Plans for 1977-78

By the end of the year, the majority of communities in the North should be licensed for municipal water supply and waste disposal. The second phase of hydro potential studies for the Bathurst Inlet area will be carried out. Environmental and surveillance activities in connection with offshore drilling is expected to increase, especially if further drilling is allowed in the Beaufort Sea.

Land Administration

Responsibilities

Management of the disposal of surface rights to Crown lands in the Yukon and Northwest

Territories, including allocations of lands for federal government programs, pursuant to the Territorial Lands Act and Territorial Lands Regulations.

Review of 1976-77

The total number of leases, sale agreements and reservations for both territories exceeded 500 in 1976-77.

Major policies were announced in January 1975 covering the disposition of territorial lands for cottage lots and agricultural purposes. The new policy pertaining to cottage lot subdivisions was designed to control haphazard development, conserve prime waterfront land and reduce speculation in Crown lands.

In January 1977, a cottage subdivision containing 53 lots was completed at Teslin Lake in the Yukon Territory. This is the third major subdivision opened by the department in the Yukon. In addition, all capital works were completed during 1976-77 at the other two subdivisions located at Marsh Lake and Tagish Lake.

In the Northwest Territories, preparatory work continued at numerous sites. Those cottage subdivisions nearing completion are located at Sandy Lake, Blackwater Lake, Madeline Lake, Pickerel Lake and Whitebeach Point.

Increased public demand for large tracts of agricultural land and limited or non-existent data on soil and climatic potentials, lead to the temporary suspension of land dispositions for large scale agriculture announced in January 1975.

In conjunction with the Department of Agriculture and the Department of Fisheries and Environment, the department has undertaken a program of soil and climatological surveys in the territories. Last year soil studies were done in the Liard Valley, and climate studies took place encompassing the southern Yukon and southwestern NWT. In 1976-77 soil studies were conducted in selected areas of the Yukon and in the Hay River Valley, NWT. Climatological studies were continued in both territories. Based on the results of these surveys, new policies and disposal plans will be developed in future.

The program of transferring blocks of land surrounding communities to the administration of the governments of the Yukon and Northwest Territories, which began in 1970, continued in 1976-77 with the development of revised criteria. To date, nine block land transfers took place in the Yukon and 16 in the Northwest Territories, encompassing a

total of 578.3 km². This program was designed to enable the territorial governments to plan and control in close co-operation with the local councils, the development and growth of the communities in their respective jurisdictions.

Other highlights of 1976-77 included the drafting and processing of revisions to the Territorial Lands Regulations, the completion and analysis of a public participation questionnaire in the Yukon designed to obtain public input for future cottage subdivision policy development, the implementation of computerized land records at headquarters and the regions, the preliminary preparation of the Mackenzie Delta Regional Plan (land use component), and the initial contracting for printing of the *Yukon Land Resources and Inventory Atlas*.

Plans for 1977-78

The cottage subdivision program will continue in both territories during 1977-78. In the Yukon general road access and upgrading will be undertaken at Marsh, Watson and Tagish Lakes and preliminary work on new cottage subdivisions in the Faro and Whitehorse areas will commence. In the Northwest Territories, subdivisions at Madeline Lake, Pickerel Lake, Blackwater Lake, Sandy Lake and Whitebeach Point will be opened to the public and preliminary work at Pontoon Lake and Tsu Lake will begin. Climate and soil surveys in support of agriculture will be completed in both territories. Blocks of land encompassing the communities of Resolute, Rankin Inlet and Tuktoyaktuk will be transferred to the territorial government. Revisions to the Territorial Lands Regulations will be enacted and revisions to the Territorial Lands Act will commence. The *Yukon Land Resources and Inventory Atlas* will be printed and distributed.

Land Use Management

Responsibilities

Control of the use of unalienated Crown lands in the Yukon and Northwest Territories and the protection of those lands from environmental damage as a result of use, pursuant to the Territorial Land Use Regulations.

Review of 1976-77

Over 350 applications for land use permits were received pursuant to the Territorial Land Use Regulations for exploration and development related activities in the NWT and in areas of the Yukon designated as Land Management Zones. Each application was re-

viewed to determine the potential environmental impact of the proposed operation and operating conditions were drawn up, following consultation with the Department of Fisheries and Environment and with communities whose interests might be affected. The majority of permits were issued for operations associated with oil and gas exploration activity in the Western Arctic and Arctic Islands, such as staging areas, well drilling, seismic surveys and access roads. Permits were also issued for such operations as road construction, mineral exploration, campsites, quarrying, land clearing, and artificial island construction.

Revisions to the Land Use Regulations were completed in late 1976 and were approved by the minister in February 1977. The revised regulations, which will control almost all land use activity on unalienated Crown lands in the Yukon and NWT were promulgated on March 3, 1977. The amendments are designed to provide more strict environmental protection to all areas in the North, to facilitate administration and to improve communication with native people regarding exploration and development.

As part of an ongoing program of granular materials inventory and planning in the NWT and Yukon, the department prepared a comprehensive site development and restoration plan for one of the major gravel deposits in the Mackenzie Delta, and conducted inventories of rock and granular materials along the Yukon Coastal Plain, the western edge of the Mackenzie Delta, and the Campbell Lake area near Inuvik.

Other highlights of 1976-77 included: a continued program of clean-up operations along the Canal Road in the Yukon; with a review of future clean-up requirements along the Haines Road; establishment of waste metal collection sites in the NWT and Yukon; revisions to the Territorial Quarrying Regulations; monitoring of road construction; and the establishment of a district office at Rankin Inlet.

Plans for 1977-78

Further granular materials investigations are planned to complete a detailed inventory of rock and gravel sources in parts of the Mackenzie River Valley and Delta in selected areas of Central Yukon, and adjacent to several northern communities. A granular materials management plan will be instituted for the Mackenzie Delta. The waste metal collection program will continue.

Forest Fire Management

Responsibilities

The aim of forest fire management is to protect life, property, timber resources, power transmission and communication lines, recreation areas, watersheds, erosion prone sites and important game habitat areas from fire. This policy is intended to maintain forest fire damage at a level consistent with the present and future needs of the people to ensure the continuation of their enjoyment and use of the resources.

Review of 1976-77

In the Yukon Territory, periods of above normal fire danger were not accompanied by as much lightning activity as in 1975. Only 112 fires occurred compared to 166 fires in 1975. Of the 112 fires, 80 were actioned in the protected zones accounting for only 0.4 per cent of the total burned area of 52 806 ha.

In the Northwest Territories, the fire season began early and ended later than normal due to atypical weather patterns. However, fire frequency was normal and of the 313 fires reported, 133 were actioned resulting in 86 674 ha being burned. The total area burned in the protected and non-protected zones was 641 832 ha.

Fire bombers were used effectively in both territories to reinforce ground crews primarily during the initial attack period of fire control operations. Two Douglas A-26 bombers were contracted for use in the Yukon, whereas in the Northwest Territories a DC-6B and two Cansos were used.

Studies continued on the assessment of forest fuel hazards within and adjacent to communities. In the Yukon, the emphasis was placed on initiating a handbook for northern residents outlining numerous ways whereby personal properties and forested areas could be safeguarded from fire. In the Northwest Territories, quantitative assessments were made of the fuel hazards in the vicinity of several settlements. The objective in the Northwest Territories is to determine the steps which should be taken to modify forest fuels to reduce or eliminate the threat of destruction by fire.

Smoke jumpers were used unsuccessfully in both territories during 1976. Ten smoke jumpers and a Beech 18 aircraft were used in the Yukon for fire detection, fire suppression and project work. For the first time smoke jumpers were used in the Northwest Territories on similar assignments. Twenty men and

two Beech 18 aircraft were contracted and based at Fort Smith and Fort Simpson.

Plans for 1977-78

Smoke jumpers will be used in both territories again next year. Fuel management programs will be assessed and further action planned to safeguard northern settlements from wildfire.

Forest Management

Responsibilities

To manage the forests of the North using recognized forest management practices in conjunction with environmental restraints.

Review of 1976-77

In both territories the forest industrial activity has decreased slightly both in production and in the number of mills operating. No new processing plants have started and none are presently being planned.

In the Yukon Territory, Watson Lake is the main centre for forest activity. The largest mills are located there and the surrounding hills and valleys support the most productive forests in the Yukon. Of the 15 mills which were operating during 1976, about half of them accounted for nearly all the production. Most of the mills are small portables but a few are semi-permanent and are located at Watson Lake. The total estimated production for 1976-77 is 77 080 m³ which consists of 50 400m³ of sawtimber, 2 793m³ of roundwood (posts, piling, building logs, mine props, etc.) and 23 887m³ of fuelwood.

Only five sawmills were operating in the Northwest Territories during the past year; three at Fort Resolution/Fort Smith, one at Hay River and one at Fort Simpson. Considerable roundwood operations took place in the lower Mackenzie River area where piling for construction on permafrost is continually in demand. For the Northwest Territories, the total estimated production for 1976-77 is 42 702m³ which consists of 34 104m³ of sawtimber, 1 252m³ of roundwood and 7 346m³ of fuelwood.

The planning of a forestry inventory for the North is almost completed and preliminary forest type maps have been made for one management unit and parts of three others.

In anticipation of the initiation of a detailed inventory program native youth are being trained in inventory procedures. The on-the-job training is taking place in Ottawa during the winter months and in the field during the summer months. Silvicultural work in the

Northwest Territories consisted of the establishment of an arboretum in Fort Smith. In the Yukon, however, with the assistance of the Pacific Forest Research Centre, regeneration trials are being conducted on a number of different sites in the Watson Lake area. The main objectives of the trials is to determine the most practical methods of regeneration after logging operations. Hardiness trials on number of exotic species of trees and shrubs are also being conducted in the Whitehorse area.

Plans for 1977-78

For the most part plans for the coming year will be to continue with the training of natives for the inventory program, finish the planning aspects of the inventory and intensify the silvicultural trials in the Yukon.

No substantial increase in industrial activity is expected in the near future due largely to the overall depressed market, inadequate transportation routes and general lack of base-line data and knowledge of available resources.

Northern Non-Renewable Resources Branch

Oil and Gas

Responsibilities

The Oil and Gas Lands Division provides managerial services in respect of the government's proprietary interest in oil and gas, and to this end is responsible for the conduct of sales of oil and gas rights, the issuance of permits and leases, the maintenance of a registry of oil and gas rights, the surveillance of royalty and other revenue functions, directly resulting from oil and gas operations.

The Oil and Gas Resources Evaluation Division is responsible for the economic and geological appraisal of individual parcels and the evaluation of the oil and gas potential in the North. It assesses exploratory programs for suitability to meet obligations to explore, receives and maintains technical data from exploration programs, maintains a library of exploration reports, and processes the geoscience data to provide information on potential reserves and land values, and assists engineers of the Oil and Gas Engineering Division.

The Oil and Gas Engineering Division is responsible for departmental activities directed to control drilling and production techniques to protect against blowouts, whether polluting or simply wasteful; to ensure that

reservoir depletion is carried out for the maximum economic recovery of oil and gas, and its proper sharing between the various producers; and to ensure that all underground fluids not produced are confined to the strata in which they are found. The division must ensure that recovery enhancement programs are instituted, and that adequate gas and oil treatment plants are built in accordance with good engineering practices. It is responsible for the prevention of pollution directly attributable to drilling and production operations, and for the safe gathering, storing, and transmission within the territories of oil and gas and by-products produced from Canada Lands in the territories and adjacent offshore areas. It is responsible for safe conduct in all aspects of drilling and production in the harsh environment of northern Canada, and for the co-ordination of activities with those agencies responsible for activities peripheral to the immediate drilling and production operations.

Oil and Gas Exploration

Review of 1976-77

Expenditures by industry on oil and gas exploration in the Yukon and Northwest Territories exceeded \$240 million in 1976; an increase of approximately nine per cent from 1975. Exploratory and development drilling expenditures increased to \$170 million (up six per cent), while total geological and geophysical expenditures increased to \$70 million, an 18 per cent increase from 1975.

On May 19, 1976 the Honourable Alistair Gillespie, former Minister of Energy, Mines and Resources and the Honourable Judd Buchanan, former Minister of Indian and Northern Affairs tabled before the House of Commons a Statement of Policy with respect to a proposed Petroleum and Natural Gas Act and new Canada Oil and Gas Land Regulations. The impact of the new legislation on existing permits and leases will be mainly to achieve an acceleration in the pace of exploratory activity. Some of the features of the new legislation are increased work obligations, shorter confidential periods for reports on exploratory projects, increased ministerial authority to order drilling of wells and commencement of production, stipulation of posted product prices and establishment of minimum levels of Canadian participation. It is anticipated that the draft legislation will be tabled in the House of Commons early in 1977.

During 1976, the total number of permits and leases declined by some 18.3 per cent.

This decrease reflects both the maturing of permits due to the passage of time, as well as shifts of exploratory effort away from less prospective areas. Based on intensive drilling and assessment programs some 10.5 million hectares in the Mackenzie Delta, Beaufort Sea and Arctic Islands were allowed to remain in permit under the discretionary remaining provisions of the Regulations.

Pending promulgation of the new Canada Oil and Gas Land Regulations, no leases have been issued since 1972. At present, lease applications received since 1972 covering almost 3.6 million hectares, are being held; almost one million hectares were applied for in 1976.

A total of 52 seismic crew months, concentrated in the Mackenzie Delta and Arctic Islands, were reported in 1976. Detailed seismic work was carried out by Imperial Oil Limited, Gulf Oil Canada Limited, Shell Canada Resources Limited, Mobil Oil Ltd. and Chevron Standard Ltd., among others in the Mackenzie Delta/Beaufort Sea areas. There were no land seismic participation programs in 1976. In the Arctic Islands, major seismic programs were continued by Panarctic Oils Ltd. on Prince Patrick and Melville Islands, and by the Sun Oil Company operating on behalf of the Arctic Islands Offshore Group, on ice in the inter-island areas, using conventional land seismic techniques. Marine seismic operations were carried out by Norlands in the Lancaster Sound area, and by the Sun Oil Company, operating on behalf of the Arctic Islands. Seismic surveys in the Baffin Bay-Davis Strait areas were carried out by Imperial Oil Ltd., Aquitaine Company of Canada Ltd., Shell Canada Resources Limited, and participating type programs were operated by Eureka Exploration and Geophysical Services Incorporated. Dome Petroleum Ltd. carried out marine seismic operations in the Beaufort Sea.

Drilling operations were concentrated in four areas in 1976: Mackenzie Delta - Tuktoyaktuk Peninsula, Mackenzie Bay, Beaufort Sea, and the Arctic Islands. In the Sverdrup Basin, Imperial Oil and Sun Oil continued drilling operations from man-made islands in Mackenzie Bay during 1976. Two wells Imp. Netserk F-40 and Sun *et al* Garry P-04 discovered significant quantities of gas and oil respectively. Off-setting wells will be drilled to test several prospective horizons which may contain hydrocarbons. Panarctic Oils Ltd. continued drilling operations from man-made ice-islands in the inter-island areas of the Arctic Islands. Two of four such ice-island

wells were development wells in the Hecla area off Sabine Peninsula, Melville Island, while the other two were exploratory wells in the Jackson Bay area off Ellef Ringnes Island. One of these, Panarctic Jackson Bay G-16A, recovered significant quantities of gas.

In the spring of 1976, Cabinet gave final approval for the drilling of the first offshore wells in the Beaufort Sea. Hunt Dome Kopanoar D-14 was spudded on August 8, 1976 from the drillship, Can Mar Explorer III. The well was abandoned on September 27 after encountering down-hole drilling problems. Dome Gulf *et al* Tingmiak K-91 was spudded on August 9 from Can Mar Explorer I. This well was suspended on October 17 after discovering a potential gas reservoir. Because of the government imposed time limit on these offshore operations, there was insufficient time to evaluate the reservoir. Hunt Dome Kopanoar M-13, also drilled from Can Mar Explorer III, was spudded on September 17 and suspended on October 13 at a depth of 485 m. Dome Hunt Nektoralik K-59 was spudded on September 21 from Can Mar Explorer II, and suspended on October 7 at a depth of 335 m.

Gas discoveries in 1976 were made at Panarctic *et al* Jackson G-16A, and Panarctic W. Hecla P-62 in the Arctic Islands; at Imp. Netserk F-40 in Mackenzie Bay; at Sun *et al* Garry P-04, the Gulf-Mobil wells Kamik D-48, Parsons N-17, Parsons D-20, Parsons L-43, Siku C-11 and Siku A-12, and Shell Niglitingak B-19, all in the Mackenzie Delta.

Oil discoveries were made at Panarctic *et al* W. Bent Horn A-02 in the Arctic Islands and at Shell Niglitingak B-19 and Sun *et al* Garry P-04 in the Mackenzie Delta.

Environmental and engineering research projects were continued, and new projects were initiated by a number of companies. North of 60°, The Arctic Petroleum Operators Association initiated 12 new projects in 1976, mainly in the areas of ice mechanics and ice defence systems research, with one study on polar bears. Imperial Oil Ltd. continued several baseline environmental studies in the Davis Strait area, Norlands is conducting a major environmental study in the Lancaster Sound area, in preparation for an application to drill a well, Pacific Petroleum is conducting a drilling feasibility study in Norwegian Bay, and Canada-Cities Service Ltd. is conducting bottom sampling studies in the Baffin Bay area. A number of other companies carried out smaller scale studies in numerous other geographical locations.

Through the Polar Gas Project, Panarctic Oils Ltd. and others continued feasibility studies on proposed gas pipeline routes from the Arctic Islands to the mainland.

In 1977, drilling is expected to continue in the offshore Beaufort Sea at six locations. Marine and land seismic programs in the inter-island areas of the Arctic Islands will be continued by Sun Oil on behalf of the Arctic Islands Offshore Group in the final year of a three years \$40 million program. A new program, involving seismic and well drilling was announced in late 1976. This "Sunarctic" program involves six companies, and is expected to cost \$80 million over the next four years.

With the continuation of drilling in the Beaufort Sea, the Arctic Islands Offshore Group and Sunarctic programs in the Arctic Islands, further delineation drilling, in the MacKenzie Delta, and further marine seismic work in the Baffin Bay-Davis Strait area, exploration activity is expected to maintain approximately the same level as in 1976.

However, because of the cost of the offshore wells, \$40 to \$50 million each, and escalating costs for exploration activity in the frontier regions, exploration expenditures are expected to increase substantially in 1977 from 1976 levels.

Oil and Gas Production

The Norman Wells Oil Field, lying in the west central part of the NWT had 59 oil wells capable of production and 33 producing regularly. Gross field production during 1976 averaged 2 751 BOP/D plus 5.2 MMCF/D of gas, for a yearly total of 1 004 119 bbls. of oil and 1 906 BCF of gas.

Six gas wells, at Pointed Mountain Gas Field, NWT; Pan Am Pointed Mountain K-45, P-53, 0-46, G-62, F-38, and A-55 (in grid area 60-30-123-45) produced at a combined gross average rate of 92.1 MMCF/D plus 324 BWP/D for a yearly total of 33 631 BCF and 256 993 bbls. of water.

The Beaver River Gas Field straddles the Yukon-BC border with one well, Pan Am Beaver River YT G-01-60-10-124-15 in the Yukon portion of the field. Production taken from the Pan Am Beaver River YT G-01 well (Mississippian Pool) during 1975 was 2.6 MMCF/D for a total of 0.966 BCF of gas. Under a royalty sharing agreement between the Government of BC and the Government of Canada, seven per cent of the production from the Nahanni Pool or 0.478 BCF was assigned to the Yukon portion of the field for 1976.

Number of Permits and Leases, and Relevant Acreage

Area	Permits	Acreage
NWT mainland	1,320	59,035,802
Yukon mainland	352	15,340,199
Arctic Islands	3,663	173,597,956
Arctic coast marine	854	39,886,219
Total	6,189	287,860,176

Area	Leases	Acreage
NWT mainland	466	2,763,230
Yukon mainland	57	242,934
Arctic Islands	NIL	NIL
Arctic coast marine	NIL	NIL
Total	523	3,006,164

Revenues Received, 1976 (Calendar Year)

Yukon Territory	Revenues
Permit fees	NIL
Transfer fees	45.00
Lease fees	50.00
Rentals	104,353.00
Forfeiture	NIL
Bonus	NIL
Royalties	144,461.21
Total	248,909.21

Northwest Territories	Revenues
Licence fees	2,425.00
Permit fees	NIL
Transfer fees	14,635.00
Lease fees	4,670.00
Rentals	2,644,722.29
Forfeiture	219,104.46
Bonus	NIL
Misc.	5,015.75
Royalties	3,604,275.80
Total	6,494,848.30
Total for Territories	6,743,757.51

Mining Division

Responsibilities

This division is responsible for the administration of mining and mineral rights (excluding oil and gas) from the time a claim is acquired to the production stage, including safety in mines. The division comprises three sections – Mining Lands, Mining Geology and Mining

Engineering. The responsibility for these operations rests with the Chief, Mining Division.

Mining Lands Section

For administrative purposes, the territories have been divided into seven mining districts. A mining recording staff is responsible for the disposition of mineral rights within each district in accordance with the applicable legislation. For each territory, there is a Supervising Mining Recorder whose principal function is to ensure that uniform practices are observed in the administration of the various mining acts and regulations.

Mining Engineering Section

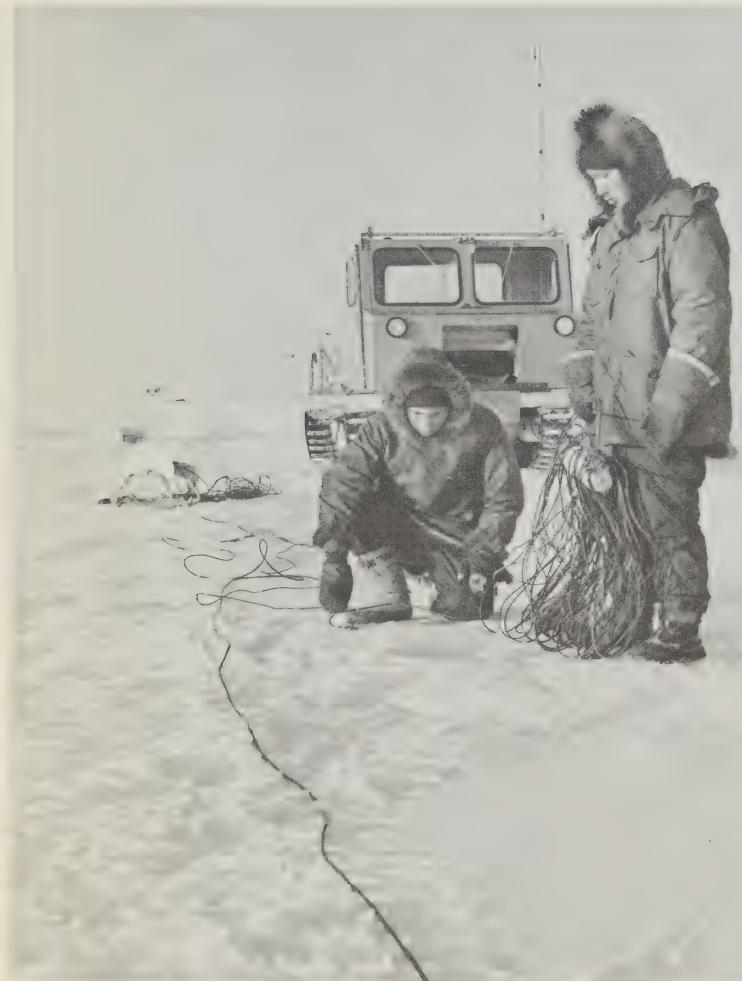
Headed by the Chief Mining Engineer who is stationed in Ottawa, this section is responsible for advice regarding the Mining Safety Ordinances and Mining Safety Rules and Regulations in mines as well as the Blasting Ordinance and Regulations in the Yukon and the Explosives Use Ordinance in the Northwest Territories and for amendments and the preparation of new safety legislation when required.

A Regional Mining Engineer is stationed in Whitehorse in the Yukon and at Yellowknife in the Northwest Territories. He is the senior mining engineer with a staff which includes a District Engineer, Electrical-Mechanical Engineer, Environmental Engineer, Mine Rescue Superintendent, Claim Inspector and clerical staff who are responsible for:

inspection of mines, quarries and blasting operations to ensure compliance with safety legislation; inspection of mineral claims to ensure compliance with the Yukon Quartz Mining Act, the Yukon Placer Mining Act and the Northwest Territories Canada Mining Regulations; ensuring that sufficient mine personnel are trained in mine rescue, recovery operations and first aid; and conducting ventilation and dust surveys, monitoring radioactive contamination, and carrying out environmental studies of all underground and surface mining properties.

Mining Geology Section

This section provides a geological information and advisory service to the mineral industry



Eskimo seismic operators lay geophones in -48°F temperatures on sea ice off Ellef Ringnes Island in the high Arctic.

in the northern territories. Regional geologists' offices are maintained at Whitehorse, Yukon and Yellowknife, NWT.

Two core libraries, the H.S. Bostock library at Whitehorse and the C.S. Lord library at Yellowknife, provide means for preserving valuable diamond drill core data for the mineral industry. Each has laboratory facilities for core splitting, diamond-saw cutting, thin-section preparation and core storage.

In co-operation with the Geological Survey of Canada, the Yukon Chamber of Mines and the Northwest Territories Chamber of Mines, geoscience forums were held in the fall of 1976 at Whitehorse and Yellowknife. Well attended by the mining and exploration communities, these meetings are held on an annual basis.

Regional and district geologists carry out mineral property examinations, collect rocks and mineral specimens and advise the mineral industry, government departments and research scientists on geological problems arising from work in the territories. The service includes carrying out geological evaluations on mining developments in the Yukon and Northwest Territories whenever government assistance is requested.

Department geologists assist prospectors and other geologists in identifying rock and mineral specimens by giving prospector training courses, in preparing geological compilation maps on mineralized areas and giving direction when requested.

Review of 1976-77

Yukon Territory

Mining Production

The value of mining production sales in the Yukon decreased by 43 per cent from \$228 659 000 in 1975 to \$130 469 000 in 1976. Production came from five mines which produced lead, zinc, copper, silver, cadmium, gold, asbestos and coal.

There were 1246 persons employed by the producing mines in 1976, a decrease of 109 persons from 1975.

*United Keno Hill Mines Ltd.
silver-lead-zinc-cadmium*

United Keno Hill Mines was hit by a strike from July 29 to September 11, 1976. Earnings were down due to lower tonnage, grade, and silver prices. Tonnage was down because of the strike and because fewer high tonnage mining areas were available for min-

ing, while grades were lower due to the effect of milling 4545 t from low grade waste dumps to provide backfill for Husky mine stopes.

*Cyprus Anvil Mining Corporation
lead-zinc-silver*

Cyprus Anvil Mining Corp. recorded a net loss in 1976. The operations were severely affected by strikes which resulted in mine and mill shutdowns over almost 50 per cent of the scheduled operating time. The intermittent nature of the operation adversely affected performance during the operating periods. As a result, the average daily throughput was less than designed capacity.

*Whitehorse Copper Mines Ltd.
copper*

For the year 1976, net earnings were increased over that of 1975. Tonnes milled rose to 728 182 from 670 909 in 1975 and the grade improved to 1.69 per cent copper from 1.52 per cent. Installation of the crusher on the 1300 m level has started and is expected to improve production efficiency by about 15 per cent. The mine was hit by a two-month strike during the summer which resulted in a loss in the third quarter of the year.

*Cassiar Asbestos Corporation
Asbestos*

The Clinton mine performed well in 1976. Production was ahead of schedule and the net profit was up 43 per cent from 1975. The total fibre production is estimated at 102 727 t, down 1.2 per cent from the 1975 production.

*Tantalus Butte Coal Co.
coal*

Tantalus Butte's total production in 1976 was 9068 t. This decrease of 61.2 per cent from the production in 1975 resulted from the strike at Cyprus Anvil, the parent company, who use the coal to dry concentrates.

Mineral Exploration

In 1976, some \$16 million dollars was spent on mineral exploration in the Yukon. This is a decrease of roughly \$2.5 million from the \$18.5 million estimated to have been spent in 1975. This decrease is due, at least in part, to an increase in activity in British Columbia. While this trend may be expected to continue in the near future, largely because of significantly cheaper operating costs in B.C., there have been a number of recent developments in the Yukon which are expected to keep exploration activity at a fairly high level, at least for the next few years.

The main areas of interest in 1976 were the Anvil Range area (Whitehorse Mining District), the Seagull Creek and Howard's Pass areas (Watson Lake Mining District) and the Bond Creek-Quartet Lakes and MacMillan Pass areas (Mayo Mining District).

Copper and Molbydenum

Whitehorse Mining District — Whitehorse Copper Mines Ltd. continued exploration in the Whitehorse Copper Belt west of Whitehorse. Diamond drilling was carried out on the Arctic Chief and North Star claims. Ore bodies in the Whitehorse Copper Belt consist mainly of bornite and chalcopyrite in skarn zones developed in limestones adjacent to diorite to granodiorite intrusions. The company also carried out 472 m of diamond drilling on the Kreft-Takacs property.

United Keno Hill Mines Ltd. carried out a feasibility study on the Minto copper deposit jointly owned by United Keno, Falconbridge Nickel Mines Ltd., Canadian Superior Exploration Ltd., Asarco Incorporated and Silver Standard Mines Ltd. The feasibility study indicated that production was unfavourable at current metal prices. The deposit is estimated to contain in excess of 7.3 Mt of 1.8 per cent copper per with minor gold and silver.

United Keno Exploration conducted an induced polarization survey on the FED claims in the Minto areas, staked the HI claims and carried out geological mapping and soil samplings.

Amoco Canada Petroleum Company Ltd. carried out 565 m of diamond drilling on the PATT claims in the Dawson Range. This company also did 598 m of diamond drilling on the CC claims and 153 m on the DOYLE claims.

Western Mines Ltd. did 740 m of diamond drilling on the Maloney Creek porphyry prospect.

Western Mines Limited carried out geological mapping and a magnetic survey on the M claims northwest of Kluane Lake. Copper sulphides occur in veinlets cutting from Permian volcanics.

Anglo American Corporation of Canada Exploration Ltd. carried out a geochemical survey on the SAM claims.

Klotassin Joint Venture continued geological mapping, soil sampling and magnetic surveys on the ROC, JEN and SKUNK claims. *Dawson Mining District* — Rio Tinto Canadian Exploration Ltd. drilled approximately 1 219 m of core on the Lucky Joe property. Mineralization consists of disseminated chalcopyrite

and pyrite in Klondike schist of the Yukon Metamorphic Complex.

In the Dawson Range Kerr Addison Mines Ltd. carried out an IP survey in Triassic volcanics on the WON claims.

Mayo Mining District — Cyprus Anvil mapped geologically and soil sampled the GREMLIN property in the Margaret Lake area. Chalcopyrite occurs within breccia and sedimentary rocks.

Lead-Zinc-Silver

Whitehorse Mining District — Exploram Minerals Ltd. did 305 m of drilling on the SM claims northeast of Whitehorse. Galena and sphalerite occurs as blebs, stringers and disseminations in brecciated graphitic slate and phyllite.

Tinta Hill Mines Ltd. did 305 m of drilling on the Tinta Hill property in the Dawson Range. Lead and zinc sulphides occur in quartz-carbonate veins in a 30 m wide shear zone.

Utah Mines Ltd. carried out geological mapping, soil sampling and electromagnetic, magnetic and gravity surveys on the AU and BRIE claims. Over 610 m of diamond drilling was performed. No significant mineralization was encountered.

Noranda Exploration Company Ltd. conducted geological mapping and geochemical sampling on its Pass Peak property. Minor amounts of sphalerite were found in Devonian dolomite.

Makir Mining Ltd. carried out gravity surveys on its CIVI, KO and MING properties in the Anvil District.

Preussag Canada Ltd. carried out a program of geochemical and geophysical surveys on the CAT claims.

Cyprus Anvil carried out an extensive program of deep diamond drilling and gravity surveys in the Anvil District on many of its claims groups.

In the vicinity of the GRUM and VANGORDA massive sulphide deposits, Canadian Natural Resources conducted a program of Turam and gravity surveys as well as some diamond drilling on its VANGORDA option.

Olympian International Resources drilled two holes that intersected some minor mineralization in cherty volcanics on the NESO claims.

Welcome North Mines, in a joint project with Getty Mining Pacific, conducted a vigorous program of geophysics and diamond drilling on a large number of claim groups for

Anvil type mineralization in the Anvil District. Conwest Exploration Co. Ltd. and Essex Minerals Ltd. in their MacMillan Joint Venture conducted a large detailed gravity survey on the SUE claim group.

Dawson Mining District — Union Miniere Explorations and Mining Corp. Ltd. in conjunction with Shell Minerals Canada Ltd. carried out an extensive exploration program called the Blackstone Project over several claim groups for Pb-Zn in Proterozoic sediments and Cambro-Ordovician carbonates.

Rio Alto Exploration Ltd. carried out a mapping and geochemical survey program on the RIO, NATE and CARB claims where oolitic iron formation and Pb-Zn mineralization were found.

Mayo Mining District — Rio Tinto geologically mapped and soil sampled the CORD claim group 11 miles southwest of Fairchild Lake in the Bonnet Plume River area. Minor sphalerite and galena occur within quartz veinlets in Helikian shale.

Cominco drilled a further 453 m on the PING claim group located on Black Canyon Creek. Galena and sphalerite occur within a breccia in Hadrynian dolomite.

Norcen Energy Resources conducted a short hole diamond drilling program on the LAURA and BUH claim groups. Minor galena and sphalerite occur in dolomite and the BUH and hydrozincite in dolomite on the LAURA.

Ogilvie Joint Venture (Mitsubishi, Brinex, Ventures West) conducted 2134 m of diamond drilling on the JASON claim group in the MacMillan Pass area. They encountered a mineralized horizon similar to the lead-zinc-barite zone on the adjoining TOM property of Hudson Bay Exploration.

In addition, gravity and geochemical soil sampling surveys were conducted over the JASON and also the PETE claims 24 km to the south.

Harman Management conducted a trenching and rock sampling program on the GYR claims in the Snake River area where galena and sphalerite occur as matrix in a limestone conglomerate of Siluro-Devonian age.

Welcome North's Arctic Red Joint Venture carried out detailed geological mapping and geochemical soil and rock sampling surveys on the REP claims in the Bonnet Plume River area. Mineralization consists of galena and sphalerite in Road River shale and calcareous argillite. In addition, geolocial mapping and geochemical soil, silt and rock sampling programs were conducted over the PR claims in the Snake River area. Mineralization consists

of float of lead-zinc-barite in shale of the Besa River Formation.

UMEX carried out detailed geological mapping and soil geochemical sampling on the LAST claims, north of Hart River in the Werneck Mountains.

UMEX carried out soil geochemical surveys on the PAT, CAL claims of Sumitomo Metal Mining Canada Ltd. located 108 km north-northwest of Mayo in the Ogilvie Mountains. No mineralization and only minor anomalies were detected.

Watson Lake Mining District — Canex Placer and U.S. Steel continued their extensive drilling program on their Howard's Pass properties. They made public some drill results in late 1976 which indicated several large zones of shale-hosted lead-zinc mineralization.

Cyrus Anvil and Hudson's Bay Oil and Gas Mining Co. Ltd. conducted a diamond drilling program on the MM volcanogenic lead-zinc-silver deposit in the Seagull Creek area.

Tintina Silver conducted further drilling on the silver-lead-zinc property south of Ross River.

Noranda conducted programs of geochemical soil sampling, CEM, VLF and gravity surveys over most of the MacMillan Property at Quartz Lake, 60 km northeast of Watson Lake. A zone of massive sulphides (mainly pyrite, galena, sphalerite) occurs within calcareous argillite and limestone of Hadrynian age. In addition, geochemical soil sampling and VLF-EM surveys were carried out over the Shannon Creek property, 44 km west of Tungsten, NWT. Mineralization consists of minor sphalerite, galena, chalcopyrite and scheelite in contact metamorphosed limy Hadrynian sediments adjacent to a Cretaceous granodiorite stock. Silt and soil sampling were also carried out on the NMT claims, 14 km north of McNeil Lake. Hydrozincite and minor sphalerite occur in Road River shale. Detailed geological mapping and geochemical soil sampling were conducted over the KET claims at the headwaters of the Ketza River where galena and sphalerite occur in quartz-carbonate veins and breccias.

Hudson Bay Exploration and Development carried out trenching and completed five diamond drill holes on the BEV claims south of the Campbell Highway in Lower Paleozoic schists. However, no economic mineralization was observed. In addition, minor geochemical soil sampling and an airborne EM survey were carried out on the BOW property south of Ross River and just west of the Tintina Silver property.

Dual Resources carried out preliminary geological mapping and grab sampling on the SUZANNE claims where galena and sphalerite occur in a limestone skarn.

St. Joseph Exploration Co. carried out a reconnaissance geochemical soil sampling program for lead and zinc over a portion of the PELLY property owned by Sovereign Metals Corporation. Mineralization consists of galena, sphalerite and pyrite in feldspar augen schist.

Welcome North Mines conducted preliminary geological mapping and geochemical soil sampling on the MAT group on the east side of Seagull Creek. Mineralization consists of massive and disseminated galena and pyrite within a sequence of slate and felsic volcanoclastic rocks. In addition, geochemical soil sampling was carried out on the SUN, SM claims to the north also underlain by Mississippian volcanic, and associated volcanoclastic and sedimentary rocks. Geology of the area consists of lower Paleozoic carbonate and clastic rocks.

DC Syndicate carried out geochemical soil sampling and an I.P. survey on the BAR claims, 1.6 km east of Wolf River. Mineralization consists of barite, marcasite and galena in clastic sedimentary rocks of Upper Paleozoic age.

Yukon Revenue Mines Ltd. carried out trenching and geochemical soil sampling in schist and phyllite on the GEM and BB claims east of Ross River and 16 km north of the Campbell Highway.

Uranium

Whitehorse Mining District — Mitsubishi Metal Corporation carried out a rock geochemical survey on the ML claims in the Aishihik Lake area.

Dawson Mining District — Chevron Standard Ltd. conducted a detailed mapping and ground radiometric survey on the "Deadman Stock" which underlies their A, B, and AB claims.

In the Blow River area, Aquitaine Company of Canada Ltd. staked over 1 000 claims in three large blocks; the BOU, BON and NET groups.

Mayo Mining District — Eldorado Nuclear Ltd. optioned uranium properties from Aquitaine-Chevron syndicate managed by Archer-Cathro and conducted diamond drilling on the PTERD and BOND claim groups in the Bonnet Plume River area. Ground radiometric and soil sampling surveys and geological mapping were conducted over the MST

claims where minor radioactivity occurs in a brecciated dolomite; over the BROM-ADROSIS claims where minor brannerite occurs within calcsilicate altered country rock in contact with an intrusive breccia; over the WERNERCKE claims where minor disseminated brannerite occurs within felsic volcanics; over the OTIS claims where minor brannerite occurs within fault breccia; over the FACE claims where brannerite occurs along fractures within a siliceous border phase of a breccia body; over the GNUCKLE claims where minor brannerite occurs in association with fractures and shear zones in breccia.

Gold-Silver

Dawson Mining District — Cons Acheron Mines Ltd. drilled three holes on the A.J. and UP claims to outline gold mineralization in a vein system.

Watson Lake Mining District — Trident Resources carried out geological mapping, geochemical soil sampling and trenching on a gold-silver-copper prospect, the SEL claims in the Itsu Range. Mineralization consists of arsenopyrite, pyrite and chalcopyrite within quartz veinlets in black shale of Devonian age.

Antimony

Whitehorse Mining District — Con-Am Resources Ltd. conducted geological mapping and a VLF-EM survey on the Becker-Cochran property in the Wheaton River area. Similar work was carried out on the DIANE claims.

Asbestos

Dawson Mining District — Pan Acheron Mines Ltd. (NPL) did some trenching on its RG claims looking for asbestos.

Tungsten

Watson Lake Mining District — Union Carbide conducted EM and magnetometer surveys and detailed geological mapping over the SUSAN property west of the Cantung Road and in addition two diamond drill holes were collared. Mineralization consists of pyrrhotite-rich skarn with very minor pyrite, sphalerite, scheelite and rare galena.

Barite

Mayo Mining District — Yukon Barite Company conducted detailed geological mapping

and stripped about 10 000 t of barite from the TEA claims south of MacMillan Pass on the Canol Road.

A 12.5 km one lane truck haul road with turnouts was completed to the property from Mile 253.6 on the Canol Road.

Baroid of Canada carried out detailed geological mapping, further rock sampling and metallurgical work on material from the claims in the Hess River area, CATHY, KAM, CHAS, etc. Stratbound beds of barite occur in shale of the Besa River Formation.

Jade

Watson Lake Mining District — Arctic Jade Ltd. did geological mapping and a few hundred metres of short hole diamond drilling on the KING, ARCTIC property, five km west of the Robert Campbell Highway and 120 km north of Watson Lake. A series of jade lenses occurs within metasediments.

Review of 1976-77

Northwest Territories

Mining Production

Production came from seven mines producing lead, zinc, copper, gold, silver and tungsten. The value of mining production in the Northwest Territories in 1976 was \$185 158 000 up from \$128 069 944 in 1975 an increase of 1.69 per cent. Lead and zinc accounted for 79 per cent of the value of production in 1976. There were 1592 people employed by the producing mines in 1976.

Giant Yellowknife Mines Ltd.

gold

Production came from underground at Giant, Supercrest, and Lolor mines and from an open pit near the south end of the Giant property. Mill throughput increased in 1976 with the open pit contributing 41 per cent of the total tonnage. The average grade of ore milled was slightly lower than in 1975, while the gold production increased.

Cominco Ltd. Con-Rycon-Vol Mines

gold

The Con Mines is currently working steeply dipping narrow gold veins over nine active levels, to a maximum depth of 1493 m. Workings are now at an excessive distance from the shaft systems and, to reduce operating costs and increase production, a new 1768 m vertical shaft is being sunk and is nearing completion.

Pine Point Mines Ltd. lead-zinc

Pine Point had a reduced volume of lead concentrate sales and higher production costs due to increased shipping activity associated with the mining of deeper seated orebodies. This resulted in a lower earnings report for 1976.

Echo Bay Mines Ltd.

silver-copper

Echo Bay Mines is still mining and milling 91 t of ore per day. The company has completed dewatering the shaft at the nearby original Eldorado Nuclear radium-uranium-silver mine to a depth of 259 m. While exploration continued, some initial development work was carried out but the company has not yet added significantly to ore reserves.

Terra Mining and Exploration silver-copper

Silver production from the Silver Bear Mine greatly increased over the 1975 production. Proven and probable reserves have been upgraded as a result of a raise in the No. 10 vein from the eighth level, and it is expected that these figures will again be up-graded as the draft on the No. 11 vein on the new ninth level reaches the projected downward extension of the ore-bearing lens. Attempts are being made to recover bismuth in a saleable form from the ore.

Canada Tungsten Mining Corporation tungsten

Sales volume and prices of tungsten concentrates from the Cantung mine improved during 1976. The record high production of tungsten concentrates during the year reflected improvement in tonnage and grade control in the mine and improved recovery in the mill. The total ore production for the year was 171 758 t.

Nanisivik Mines Ltd.

zinc-lead

This company began production in September, 1976 and have been stockpiling their concentrates awaiting the 1977 shipping season.

Mineral Exploration

Expenditures on mineral exploration in the Northwest Territories continued at a high level in 1976, probably exceeding the 25 million dollars estimated to have been spent in 1975. Only in the Arctic Islands was there a decline. Significant discoveries and new emphasis emerged in other areas to keep expenditures equal to, or raise them above, 1975 levels.

There were significant increases in uranium exploration throughout the territories with major expenditures in the Keewatin and in the immediately adjacent southwest Mackenzie District. Discoveries on Pan Ocean ground near Baker Lake have added impetus to this activity.

Uranium possibilities in the Apebian sediments on the Kiloigok Basin in the Bathurst Inlet area have become an important target. Uranium is reported in highly fractured rocks in a large graben subsidiary to the Bathurst Trench.

Base metal — silver targets in volcanic rocks in the Slave Province continued to excite interest, and Texagulf added to the reserves of the Izok Lake deposit. The focus of greenstone-belt exploration has shifted westward in the last year but further discoveries can be expected on the eastern side of the province.

Discoveries during the last 20 years in the northern Slave Province and adjacent northern Bear Province suggest a need for a new transportation route across the barrens to provide access to the sea at or near Baker Lake. This would permit relatively inexpensive movement of bulk materials and facilitate the development of mineral deposits in the Coppermine, High Lake, Izok Lake and Hackett River areas.

In the mountains widespread investigation of the copper potential of carbonate members within predominantly clastic, late Proterozoic units replaced lead-zinc as the major activity, but the latter continued at a high level and some new lead-zinc discoveries may be announced in the near future.

Discoveries by Western Mines west of Pine Point give promise for new mining ventures in the territories' most important mineral producing area.

Gold and Silver

Precious metals exploration in the NWT declined to a low level. Exploration is concentrated in the Bear and Slave Geological Provinces where the major expenditures were at the Con and Giant Mines.

Keewatin Region — A small crew improved the road from the Cullaton Lake airstrip to O'Brien Gold Mines Ltd.'s mine.

Bear — Slave Region — Duke Mining Ltd. and Terra Mining and Exploration Ltd. continued underground exploration on their BULL-MOOSE Lake property.

Cominco Ltd. continued shaft sinking and the Con Mines and drilled on the Kamcon property.

Geophysical Engineering Ltd. completed EM and magnetometer surveys on the YT group, optioned from the Nugget Syndicate.

Giant Yellowknife Mines drilled four holes to test the Crestaurum shear zone at depth and drilled 18 holes in a continued evaluation of the Salmita property. Giant continued surface drilling on its Yellowknife mining leases during the year to outline additional ore reserves.

Texagulf Inc. drilled a gold prospect between Pint and Itchen Lakes.

Terra Mining and Exploration Ltd., Sunshine Mining Company Ltd. and DuPont of Canada Exploration Ltd. flew EM-magnetic-scintillometer surveys to locate sulphide zones which can have associated silver bearing veins. The project was managed by DuPont.

Nahanni Region — A DIAND crew panned trace amounts of flour gold at the mouth of the River Between Two Mountains.

Base Metal Exploration

Keewatin District — Essex Minerals Company Ltd. did ground geophysical surveys and 588 m of diamond drilling on five geophysical anomalies in the Quartzite Lake and Heninga Lake areas.

Noranda Exploration Company, Ltd. drilled 366 m in three holes in the Maze Lake area and one hole in the Kaminak Lake area to explore EM anomalies. The results were not encouraging. Noranda mapped the greenstone belt southeast of Yathkyed Lake and the copper showings, explored by Canadian Nickel Company Limited in 1964, on Angikuni Lake.

St. Joseph Explorations Ltd. conducted geochemical, ground EM and magnetometer surveys in the Heninga Lake area over anomalies detected by the 1975 airborne survey. Fourteen holes were drilled on geophysical anomalies and seven on the Gemex massive sulphide deposit, a total of 2743 m of drilling.

Cominco Ltd. surveyed the DEE claims at Spi Lake with magnetometer and EM equipment. The geology of the claims was mapped and the base-metal potential of the area and that of the Baker Lake area were assessed. *Arctic Islands* — Reconnaissance mapping and prospecting explored for Pb-Zn on Cominco Ltd.'s prospecting permits near Clyde River.

In the fall, Nanisivik Mines Ltd. commenced mining lead-zinc at the Strathcona Sound

deposit. In March and April, Canadian Superior Exploration Ltd. did rotary drilling on its SUP claims northeast of Resolute Bay.

Slave Lake Area — Western Mines Ltd. and of Canada Exploration Ltd. report 2.5% of drill indicated material averaging 4.1 per cent lead and 11.9 per cent zinc on their claims west of Pine Point.

Pine Point Mines Ltd. continued routine exploration on its Pine Point claims and staked additional claims. They also staked more claims in the Windy Point area. *Bear-Slave Provinces* — Shell Canada Ltd. explored for base metals in the East Arm Subprovince.

Norcen Energy Resource Ltd. drilled one hole on the BBX property, a continuation of a 1975 program by Great Plains Development Company of Canada Ltd., which company was acquired by Norcen in 1975. Exploration by Norcen included geochemical rock and gossan sampling, near Chalco Lake, geochemical rock and gossan sampling and a small amount of geophysics in the Muskox Lake area, geological and rock geochemical surveys in the vicinity of Point Lake, and staking, EM surveying, and trenching on a sphalerite-chalcopyrite-pyrrhotite occurrence, located through rock geochemistry.

Two men from Hudson's Bay Oil and Gas Ltd. reconnoitered the geology of prospecting permit 432 north of the eastern end of Point Lake and of Aylmer Lake, Uist Lake and Beauparlant Lake areas.

Long Lac Mineral Exploration Ltd. staked claims on and adjacent to its prospecting permits 336 and 337.

St. Joseph Explorations Ltd. did geological and geochemical surveys at Victory Lake.

EM, magnetometer and geological surveys by Kennco Explorations (Canada) Ltd. explored the Windflower Mines Ltd. property at Clinton Colden Lake.

Noranda Exploration Company Ltd. continued investigations of the base metal potential of Slave Supergroup volcanic rocks at Aylmer Lake, Indin Lake, and around Point Lake. Noranda, Cominco and Texagulf have staked claims in an arcuate belt northeast of Point Lake. Noranda drilled the HI and AMISK groups. Diamond drilling and an IP survey tested Noranda's SUE-DIANNE property.

Cominco Ltd. continued its wide ranging exploration in the Mackenzie Region. Bases at Rae and near Lac La Martre were used for regional reconnaissance. Geological and geochemical surveys and trenching explored a galena-sphalerite showing on the PALE group, and trenching tested the nearby BACK group.

Numerous claims were staked by Cominco between Contwoyo and Itchen Lake along an arcuate belt containing metavolcanics. Part of this belt was mapped, as was an area near Scotstoun Lake and Irritation Lake. At the Bathurst Norsemines option, relogging of drill core continued and detailed geological surveys filled gaps in map coverage.

A preliminary economic study of the Bathurst Norsemines property by Wright Engineers Ltd. for Bathurst Norsemines Ltd. gave reserves of 19.55 t in six zones having an overall average grade of 0.44 gm/t Au, 149.51 gm/t Ag, 0.41% Cu, 0.75% Pb and 4.98% Zn.

Western Mines Ltd.'s (Brascan Resources Ltd.) work on the Yava property was reduced compared with 1975. Geological, geophysical and geochemical surveys around the Main Zone were carried out.

Geological mapping, EM surveys and trenching by DuPont of Canada Exploration Ltd. on various claims groups in the Back River-Muskox Lake area tested anomalies identified by 1974 airborne surveys.

Texasgulf Inc. resumed drilling at Izok Lake where over 10.95 t grading 13.7% Zn, 2.82% Cu, 1.42% Pb and 70.14 gm/t Ag has now been outlined.

Farther north drilling and geophysics continued on targets in volcanics on what was previously a Texasgulf prospecting permit. Two small drilling projects were executed on the PAN and PAR/PAL groups and extensive staking and preliminary exploration followed airborne surveys west of Contwoyo Lake. Texasgulf also drilled a few holes into an extensive gossan on the INC group, and did reconnaissance around Canoe Lake.

Giant Yellowknife Mines Ltd. drilled gossans in volcanics north of the Acadia gold property.

Rayrock Mines Ltd. optioned the Crestland uranium property and began mapping, prospecting and scintillometer surveys.

Nahanni Region — Nahanni Placers and Cambria Exploration completed prospecting and soil/stream geochemical surveys of shales on prospecting permit 424.

Golden Ram Resources drilled at least five holes on its Alpha Bravo property to test lead and zinc occurrences in metamorphosed Road River shale.

Serem Management mapped and trenched anomalous areas in the Road River — Besa River shales on the NOR claim group. The TICK group was mapped and prospected and selected areas of the shales in the Selwyn Basin were examined.

Diamond drilling, geochemical surveys, trenching and geological mapping explored the OP, XY and ANNIV claims as part of the Canex Placer/U.S. Steel Western Hemisphere Ltd. continued effort to outline lead-zinc mineralization in the Road River shales.

Prospecting, geochemical and geophysical surveys, geological mapping and diamond drilling tested Shell Canada's Keele Permit area and the Coates Lake property. Regional prospecting and geological mapping, part of the search for stratabound copper deposits in carbonates of the Redstone and Copper Cap Formations, extended from the Twitya River to Coates Lake.

Geological mapping, geochemical surveys and prospecting covered parts of Canadian Nickel's JOE and DAL claims which were acquired last fall in the staking rush that followed the release of Geological Survey of Canada Open File 298. The TET-RAP claim group optioned from Welcome North was explored by IP survey and a diamond drill hole tested an anomaly outlined by the survey. The target was apparently copper-lead-zinc mineralization in the Copper Cap Formation.

Geological and geochemical surveys by Cominco Ltd. on the CAP claims were followed by drilling of lead-zinc in a solution-collapse breccia in Landry Formation. The ADYJO claims which partly cover the Redstone and Copper Cap Formations, were geologically mapped and prospected. Cominco also did regional surveys in the Carcajou Canyon area.

Rio Tinto Exploration mapped and prospected the EE, DB, CL and BP claims in the Hayhook Lake area, which cover copper mineralization in the Redstone- Copper Cap Formations. Extensive diamond drilling on the RT group in the Gayna River area, explored lead/zinc mineralization in several types of breccias associated with well developed Helikian stromatolitic reefs.

St. Joseph Exploration Ltd. reviewed many of Welcome North's carbonate hosted lead/zinc occurrences in the Godlin Lakes region.

The ANT claims were staked for Canico during a regional search for mineralization in extensions of the Redstone Formation in the Mount Eduni area.

Bethlehem Copper drilled at least three holes on the BEAR-TWIT property to test the depth potential of lead/zinc in Ordovician-Silurian carbonates.

Welcome North Mines Ltd. mapped and prospected the REV group and extended detailed mapping and prospecting on the AB

claims, where several new occurrences of lead/zinc were found. The Road River — Besa River shales in the Bonnet Plume area were explored for stratiform lead/zinc.

Cordilleran Engineering appraised the regional possibilities of Road River and Besa River Shales in the Selwyn Basin.

Uranium

Keewatin District — Geochemical, geophysical and geological surveys covered Noranda Exploration Company Limited claims and uranium showings in Dubawnt Group sediments in the Yathkyed-Tulemalu Lakes area. Radiometric surveys were flown and numerous claims staked.

Claims in the Yathkyed-Tulemalu Lakes area were mapped and surveyed with radiometric instruments by Essex Minerals Company Ltd.

Geological and geophysical surveys were done on Pan Ocean Oil claims in the Yathkyed-Tulemalu Lakes area and a radiometric survey of its prospecting permits at Tulemalu and Yathkyed Lakes was flown by Kenting Earth Sciences Ltd.

Reconnaissance and detailed geochemical, geophysical and geological surveys covered Urangesellschaft Canada Limited claims and adjacent areas in the Yathkyed-Tulemalu lakes area. Airborne radiometric surveys and reconnaissance geochemical lake water and sediment surveys were carried out on Urangesellschaft's prospecting permits southwest of Dubawnt Lake.

A second Urangesellschaft crew completed evaluation of prospecting permits in the Sissons-Baker Lake area and flew reconnaissance radiometric and geochemical studies on the company's permits and the adjacent area northwest and southwest of Baker Lake.

Shell Canada Ltd. mapped and tested its prospecting permits to the east and south of Dubawnt Lake and west of Yathkyed Lake with airborne and ground radiometric surveys and lake sediment geochemical surveys. Detailed radiometric geological surveys explored uranium showings on the BAK claims.

A crew based at Baker Lake flew radiometric surveys on Uranerz Exploration and Mining Ltd.'s prospecting permits south of Garry Lake and west of Dubawnt Lake. A second crew surveyed the geology of the edge of the Thelon Basin and surveyed the geochemistry of water and sediments in nearby lakes.

Brascan Resources Ltd. investigated the uranium potential of the Kinga Lake area and then conducted detailed and reconnaissance

geological and geochemical surveys of their prospecting permits near Amer Lake.

Union Oil Ltd., operating out of Baker Lake, completed studies of the Rio Alto Explorations Ltd. prospecting permit southwest of Baker Lake and assessed the potential of the area.

A large Cominco Ltd. crew at Kazan Falls engaged in detailed geological and geophysical surveys of the area southeast of Baker Lake. Some 915 m of additional diamond drilling probed the main showing explored in 1975. A smaller crew investigated the uranium potential of the Snowbird Lake area and the Baker Lake Region.

Arctic Islands — Detailed geological and ground radiometric surveys covered Imperial Oil Ltd.'s claims northeast of Cape Dorset.

Noranda Mines Ltd. did reconnaissance radiometric surveys on northern Baffin Island between Pond Inlet and Fury and Hecla straits.

Uranerz Canada Ltd. and Trigg Woollett Associates each did a brief uranium reconnaissance of parts of Victoria Island.

South Slave Lake — The release of results of a lake sediment geochemical survey of a large area centered on Nonacho Lake by the Geological Survey of Canada in May prompted a minor staking rush. Brascan Resources Ltd., Imperial Oil Ltd., Trigg Woollett Associated, Denison Mines Ltd., Canadian Occidental Petroleum and several individuals took part. Mattagami Lake Mines Ltd. also had exploration crews in the area.

East Arm Subprovince — Halferdahl and Associates reconnoitered the East Arm Subprovince for an undisclosed client.

At Meridian Lake and Charlton Bay, Rio Tinto Canadian Exploration Ltd. continued track etch surveys begun in 1975.

Brascan Resources Ltd. prospecting the Reliance area of the East Arm where they investigated lake sediment anomalies reported in a recent Geological Survey Open File release.

Geological mapping and diamond drilling by Seru Nucléaire tested the Vestor option on Simpson Island. Seru staked the SBI and JG groups in the Bathurst Inlet area following airborne reconnaissance and radiometric surveys. Helicopter-borne radiometric surveys and geological reconnaissance covered Seru's Prospecting Permits 428 and 429 near Point Lake and 430 and 431 near Melville Creek.

Geological, geophysical, and geochemical surveys by Uranerz Canada Ltd. on parts of the JONES group and airborne radiometry of

several areas in the Bear Province, and areas in the Slave Province north and south of Takijug Lake were conducted from Echo Bay. Prospecting, geophysics, geochemistry and property evaluation were done from a camp on Hottah Lake. Geological, geochemical and geophysical surveys explored Uranerz's prospecting permit and adjoining claims.

A six hole, 230 m drill program was underway in October on Andex Mines' uranium property near Slemton Lake.

The Aquitaine Company of Canada Ltd. staked one small claim group after an airborne radiometric survey. Radiometric prospecting covered Aquitaine's PEC group near Dismal Lakes.

From a base at Basler Lake Conwest Exploration Company Ltd. sampled sediment in lakes on Snare Group rocks.

Noranda Exploration Company Limited has been acquiring ground in the Bathurst Inlet Area following 1975 airborne radiometric and geochemical surveys. Evaluation of some of Noranda's anomalies in this area began. Drilling, geological and geochemical surveys tested Noranda's six prospecting permits on Leith Peninsula which cover a ridge of Aphelin granitic rocks surrounded by Helikian Hornby Bay Group supracrustals and Phanerozoic sediments.

Following geological reconnaissance and group geophysical prospecting in the Kilohigok basin, Essex Mineral Co. Ltd. staked in two areas along a graben, near the mouth of the Burnside River and near Bathurst Lake. Claims were also staked 40 km southwest of Bathurst Lake on ground mainly underlain by the Western River Formation, basal member of the Proterozoic Goulburn Group.

A large Cominco Ltd. camp at Salamander Lake was a base for regional geological and airborne radiometric surveys. Cominco, early arrivals in the Bathurst Trench, hold only the POMIE group at Bathurst Lake and the JCW group just west of Salamander Lake. Trenching, geophysical and geological surveys tested these groups. Airborne radiometric surveys, geological mapping and prospecting explored Cominco's prospecting permits. The KUM group showing, which lies on the common boundary of the permits, was trenched.

A small Chevron Standard Minerals Ltd. crew did lake sediment, geological and geophysical surveys in parts of the Bear Province from a base at Hottah Lake.

Additional drilling tested Imperial Oil Ltd.'s YUK group which was greatly enlarged by staking additional claims to the northeast, ex-

tending the block to the shores of Dismal Lakes.

Other Minerals

Arctic Islands — Diapros Canada Ltd. collected heavy mineral samples in a search for kimberlite on Somerset Island.

Interior Plains — Phoenix Canada Oils Co. obtained coal leases in the Scented Grass Hills on the west side of Great Bear Lake.

Extensive gravity surveys between Great Bear Lake and the Arctic Coast by Photogravity Surveys Ltd. may be of use in mineral exploration. These surveys were done in 1976 to sell to oil and gas exploration groups.

Nahanni Region — Amax Exploration continued development at the Mactung tungsten property in preparation for a tentative planned opening in late 1981 or early 1982.

Mine Rescue

Central Mines Rescue Stations are maintained at Whitehorse, Yukon and Yellowknife, NWT. Substations are established at each mine. The department now owns 101 Drager GB-174 four-hour breathing apparatus. It is the policy of the department to have a minimum of 12 Drager units at each mine so that the mine rescue team can begin a rescue operation before the arrival of trained personnel from the central station.

Mine Rescue teams from both territories compete in the Canadian Mine Rescue Championship each year. In 1975 the competition was sponsored by Alberta and held in Calgary in June. Six teams competed from British Columbia, Alberta, Yukon, Northwest Territories and Nova Scotia. The Cominco team from the Con-Ryon Mine, Yellowknife won the competition.

Mining Safety Statistics

Yukon and Northwest Territories

The USA Standard Method of Recording and Measuring Work Injury Experience is used in the mining industry in the North. In accidents resulting in death, permanent total disability or permanent partial disability in the territories, the number of days recorded as lost-time conforms with the time charges set down in the American Standard.

Disabling injuries are defined by the USA Standard at being those which result in death, permanent total disability, permanent partial disability or temporary total disability.

Days recorded as lost-time do not include the day of the accident or the day of return to work.

Accident frequency is expressed as the number of accidents per million man-hours worked.

Accident severity is expressed as the number of days lost due to accidents per million man-hours worked.

Accidents Statistics – 1976

In 1976 there were 31 disabling injuries reported in the Yukon. The accident frequency for disabling injuries decreased from 24.97 in 1975 to 13.93 in 1976. There was also a decrease in the accident severity rate from 2902 in 1975 to 471 in 1976. 'Fall of persons' and 'strain while lifting' were the chief causes of accidents in 1976 followed by 'caught between two objects' and 'miscellaneous causes'. The three main causes accounted for 68 per cent of all report accidents. No fatal mining accidents occurred in the Yukon in 1976.

In the Northwest Territories, 121 disabling injuries were reported in 1976. The accident frequency rate increased from 22.85 in 1975 to 36.43 in 1976 and the severity rate increased from 2460 to 13 319. 'Fall of persons' was the main cause of accidents in the Northwest Territories accounting for 26 per cent of all accidents. This was followed by 'caught between two objects', 'struck by moving object' and 'strain while lifting'. These four main causes accounted for 65 per cent of all accidents reported. Seven fatal accidents occurred in the Northwest Territories in 1976.

Indian and Eskimo Affairs Program

Northwest Territories

Responsibilities

The regional office for Indian and Eskimo Affairs in Yellowknife assists the registered Indian population in the NWT in social and economic development, in close consultation and collaboration with the band councils and the Government of the NWT. Specific activities include:

fulfilling the government's annual treaty obligations to bands and individual Indians; operating the Core Funding Program to band councils to provide training in administration and financial management, to band councils and staff; economic development; serving as a liaison between Indian people (usually represented by their band councils) and the various levels and agencies of government.

Review of 1976-77

The Core Funding Program continued to provide band councils with the opportunity to build administrative centres and employ staff in the administration of band business. The training program for band councillors and staff was increased. All councillors participated in one of a series of two-day workshops to identify their training needs and plan a training program for 1977-78. Several band secretaries participated in the territorial government training program for settlement secretaries. Training events of one or two days duration took place in the settlements at the request of the band councils.

Assistance (in a liaison role) was provided to two programs for members, with co-operation from Canada Manpower (Job Creation Branch), CMHC, the Territorial Government Housing Corporation and the Territorial Government Town Planning Division.

The Economic Development Branch, working in close liaison with the Department of Economic Development of the Government of the Northwest Territories issued 12 direct loans totalling \$125 685. This increased the total loans outstanding in the Northwest Territories to \$1.6 million for 43 Indian businesses. Assistance was provided for infrastructure, management, technical and professional advice by way of contributions and grants totalling \$210 000 and amounting to \$642 009 since April 1972. Projects ranged from a heavy construction company, an industrial catering camp and a pool hall, down to small municipal contractors' loans and trappers' loans.

The staff of the Indian Economic Development Branch increased to four to assist in the preparation of applications, requests for funding, credit collection and post loan counselling.

Plans for 1977-78

The training program will be given greater emphasis. All band councillors and staff will be given opportunities to increase their

knowledge and skills in administration and financial matters, as well as specific information on the organization of the federal and territorial governments so that band councils may benefit from the many government programs available. Through the training program we hope to see improvement in the band council management and reporting of the Core Funding Program.

In economic development, the Indian Economic Development Fund will continue to provide opportunity for Indian business people to establish and expand their businesses. With slightly increased staff in the program more emphasis will be placed on business counselling and especially on post loan counselling.

Yukon Territory

Responsibilities

The Regional Director General, with headquarters in Whitehorse, is responsible for: Community Affairs (not all services); Education (Placement and Relocation Services, University and Professional Training, Vocational Training outside Yukon, Maintenance of Pupils in Post-School Programs, High School Summer Student Programs); Economic Development.

Community Affairs

Responsibilities

To administer sections of the Indian Act that have general application to all Indians and in particular those sections that apply to Indian reserves. There are six Indian reserves in the Yukon Territory but only two: Carcross and Teslin are occupied. The applicable sections of the Indian Act that are generally administered in the territory are those referring to membership, band councils, management of Indian monies, estates and other related matters.

Review of 1976-77

Social Assistance

Six bands administered the Social Assistance Program on behalf of the department: Whitehorse, Teslin, Liard, Ross River, Champagne-Aishihik and Kluane.

Two field officers and one social welfare administrator stationed in regional office under the regional supervisor of social services administer the program to the other seven bands.

There has been an increase of two in the number of bands administering the Social Assistance Program.

The regional supervisor of social services held two workshops for band welfare administrators and conducted two program reviews during the period under review. Services to Indian people has been improved and savings have resulted in consequence of these measures.

Child Care

The Yukon Department of Health, Welfare and Rehabilitation has responsibility for this program. All direct costs, plus an administrative cost \$10 000 are charged to the Community Affairs Branch.

A review of the child care non-ward program has resulted in an increase in the amount paid to foster parents for the care and maintenance of such children. This change more accurately reflects the value of such private placements and concern for the well being of the people involved.

Adult Care

A comprehensive review has been made of the Adult Care caseload, emphasizing as last year, the support of the department for the care of adults in their home communities.

Rehabilitation

A major review of the Rehabilitation caseload was conducted during 1976-77. As a result the level of contact with individuals receiving treatment outside the Yukon must be improved. The intention is to establish more personal contact with these individuals in the hope that they may be repatriated to the Yukon or, maintain contact through the department with the family and friends. During 1976-77 we have repatriated two individuals to the Yukon.

The financial commitment to alcohol treatment centers has been increased.

A Rehabilitation Centre (sheltered workshop) for the mentally retarded and the physically handicapped opened in 1976 and in co-operation with Rehabilitation Services of the Yukon Territorial Department of Health, Welfare and Rehabilitation three individuals entered in the program.

Community Improvement

This branch participates in two types of housing for status Indians: the off-reserve housing program; and the subsidy housing program on Land Set Aside for the Use of Indians. Projects completed during 1976-77 include: 38 new homes constructed; 30 existing homes underwent repairs; one new band hall was built at Champagne; two band halls: one in Liard and the other in Dawson were renovated; one wash house was built for the Kluane Band at Burwash Landing; electrical upgrading was completed in 50 homes; and work opportunity program funds were used in addition to capital funds and LIP funds to build or repair the band facilities noted above.

Band Management

Contributions to bands during 1976-77 amounted to \$2 318 196.09. This figure includes both Capital and O&M Funds.

Training in band management continued as a priority item during 1976-77. Difficulties have been encountered because of heavy staff turnover, however, only two bands were under co-administration status.

Meetings were held at which all chiefs were present to discuss both the O&M and Capital budgets. The intent of these meetings was to encourage planning in the use of funds at the band level.

Renovations to band offices in Dawson and Liard have been made.

Plans for 1977-78

Social Services

The following plans are contemplated to continue efforts to improve service delivery: conducting at least two workshops; conducting two administrative reviews; efforts will be made to increase our contact with status Indians who are receiving treatment in institutions outside the Yukon; the co-ordination of our efforts with those of other agencies and departments to increase job creation activity; and the promotion of local involvement in all areas of social services.

Community Improvement

The following activities are planned for 1977-78: construction of 41 new homes under the subsidy housing program; installation of sewer facilities for three band buildings in Teslin; construction of band offices in Carmacks, Mayo, Selkirk and Teslin; construction of a storage building in Mayo; continuing a program of major renovation to housing in most villages; and the construction of 2.8 km of new road.

Band Management

The following activities are planned for 1977-78: preparation of budgets in relation to the actual costs of running programs; implementation of the Band Work Program on a limited scale; hiring of a band training facilitator who will be responsible for planning and developing required training programs in areas such as local government.

Economic Development Branch

Responsibilities

In co-operation with the Indian people, other government agencies, private firms, organizations and individuals, to plan, organize and initiate a comprehensive economic development program to include logging, sawmill operations, big game outfitting, handicrafts, trapping, fishing, commercial and industrial development, and to stimulate a steady growth of self reliance and economic independence.

Review of 1976-77

Fishing

Most fishing is for home consumption. Commercial fishing is done on a very small scale.

Big Game Outfitting

Teslin Outfitters Limited, a company owned and operated by Indians, continued to provide a high quality service. They were fully booked during 1976-77.

Atlin Indian Band members attended an outfitting course and will be starting their own outfitting business in 1977-78.

Handicrafts

The Yukon Arts and Crafts Society, founded in 1974, began to develop a comprehensive program emphasizing production and marketing, and providing training and financial assistance to develop a viable arts and crafts industry in the Yukon.

New arts and crafts stores were opened in Haines Junction, Carmacks, and Carcross, and construction of a production center began.

Forestry

Two forestry operations, currently managed by Indian people are successful. A third had to close down because of managerial and liquidity problems.

Trapping

There was a 50 per cent decrease in demand for trappers' assistance because of mild weather.

The Yukon Trappers' Association which received departmental loans in the past was able to raise financing from regular financial institutions.

Commercial

New stores were opened in Upper Liard, Lower Post and Burwash. Training was provided to the storekeeper in Pelly Crossing.

Industrial

A canoe factory was opened by members of the Teslin Indian Band. Some 30 freighter canoes have been produced to date, with sales to individuals and several government departments.

Indian Economic Development Fund

During 1976-77, 20 loans totalling \$146 000 and 21 grants totalling \$277 400 were approved.

Education Activities

Responsibilities

Indian and Eskimo Affairs is involved indirectly in providing services to elementary and secondary school students and is directly involved in post-secondary school, adult education and vocational training programs.

Review of 1976-77

Post Secondary Education

A total of 26 students were sent to institutions in the south. Most of these students enrolled in vocational or university courses. Six students were enrolled in the Grade 12 Foundations Program; all should complete the program by June 1977 and are interested in university education.

Elementary and Secondary Education

A total of 115 students of elementary and secondary age were placed in Yukon Hall and are attending classes at all levels in Whitehorse. Ten Grade 12 students will graduate in June.

Twenty students were placed in private homes throughout the territory.

Cross Cultural Co-ordinator Program

During 1976-77 the Cross Cultural Co-ordinator Program began and has met with considerable success. Seven individuals were chosen by the bands to work in the program as co-ordinators to provide a link between students, school and parents.

Band Staff Training

Management training was provided to four store clerks. Some training in janitorial work was also completed.

Plans for 1977-78

There will be emphasis on student employment opportunities during the summer of 1977-78. Funds are being made available to bands to hire students to work on various band projects.

Proposals for a Summer Job Corps will be finalized. This corps will provide an important community function in both jobs and service.

The Education Program will continue to respond to the requests for specialized training that come before it.

Finance & Administrative Services

Review of 1976-77

The 1975-76 band non-audits were completed and submitted to Ottawa by June 30, 1976. Arrangements have been made for 1976-77 audits to be performed in the Indian Communities of the region. In November 1976, Yukon Regional office was relocated to the third floor of the Federal Building, Whitehorse. The purpose of the move was to provide one location for the regional office, however, it was found that the acquired office space was not adequate and additional space is being sought.

Technical Services

Community Improvement

In 1976-77 the following was completed: 38 homes were constructed during 1976-77 under the subsidy housing program; 30 homes were renovated and repaired; 50 homes had electrical upgrading completed; one new band hall was built at Champagne during 1976; one new wash house was built at Burwash Landing; road construction totalling 4 km was completed in five Indian villages; five domestic water wells were drilled in four Indian communities to overcome sanitation problems; and 80 per cent of the housing work was carried out and completed by Indian workmen.

Parks Canada

National Parks Branch

Responsibilities

The National Parks Branch is responsible for Canada's national parks and national landmarks. The Branch examines and evaluates terrestrial and marine sites to determine their potential as national parks and landmarks, and plans for the development of existing parks. There are five national parks or reserves north of the 60° Kluane in the Yukon Territory; Wood Buffalo; Nahanni; Auyittuq;

and an area on the East Arm of Great Slave Lake in the Northwest Territories. Auyuittuq in Inuttituut means "Land of the Big Ice", the name selected in 1975 for the national park on the Cumberland Peninsula of Baffin Island. The lands of Nahanni, Kluane and Auyuittuq are described in Parts one, two and three respectively of Schedule five to the Act to amend the National Parks Act, 1974 and were proclaimed as parks April 5, 1976.

Review of 1976-77

Aerial and ground reconnaissance surveys were made north of 60°. As a result, two new Natural Areas of Canadian Significance (NACS) were identified. In addition, preliminary resource analysis studies were prepared for five National Park areas identified in 1975-76.

Plans for 1977-78

Field work to be undertaken includes: regional analysis of Natural Region 10, Mackenzie Delta, NWT; regional analysis of Natural Region 37, Eastern Arctic Lowlands, NWT; biological and oceanographic theme studies of the Western Arctic Marine Region, the Eastern Arctic Marine Region, and the Hudson Bay Inland Sea; documentation of Herschel Island as a possible Marine Natural Area of Canadian Significance (NACS) for the Western Arctic Marine Region; documentation of the possible Lancaster-Cumberland Sound Marine (NACS) for the Eastern Arctic Marine Region; social issue review of the Firth River area, NACS; socio-economic study of the Banks Island and Bathurst Inlet NACS; biophysical land classification studies at Ellesmere Island, Banks Island, Bathurst Inlet, Wager Bay and Firth River; a fish and wildlife study at Wager Bay; and an Arctic hare study on Axel Heiberg Island.

Kluane National Park

Review of 1976-77

Extensive preliminary work was done to prepare for public participation in the development of a master plan.

Several interpretive programs were introduced or expanded including overnight and day trips using existing mining roads into the park. Work continued on development of a

self-guiding trail. The extension program was expanded to include more communities in the Yukon. The Youth Conservation Corps continued with more participation by natives. The biophysical land classification research and limnology study continued.

Liaison, through informal discussions, was maintained with the Council of Yukon Indians, relative to the master plan process as well as other issues affecting native people.

Plans for 1977-78

The first and second stages of the public participation program will be conducted.

Preparations for the interpretive plan will begin and opportunities will be provided for the visitor and resident to learn of the park's natural features.

Mammal studies will begin this year and the limnology and biophysical land classification will continue. Efforts to attract more natives into the Youth Conservation Corps will increase. Consultations with the Council of Yukon Indians and other organizations will continue.

Nahanni National Park

Review of 1976-77

Three years of work on the biophysical land classification was completed. A limnology study and the Environmental Impact Assessment of Deadman Valley were initiated.

Interpretive planning studies were carried out at Rabbit Kettle Hotsprings and Kraus Hotsprings.

The last draft of the Interim Management Guidelines was completed. This document will provide guidance in the operation of the park until sufficient data can be gathered to prepare a master plan.

Plans for 1977-78

Resource studies including a fire history study, a mammal study and an environmental impact assessment of the area around the junction of the Flat and Nahanni Rivers are planned.

Extension programs for communities surrounding the park will be developed. An audio-visual program will be available for distribution.

Efforts towards maintaining contact with the people of the North will be increased. Consultations with territorial officials on a formal basis is planned.

Wood Buffalo National Park

Review of 1976-77

The revised Wood Buffalo Game Regulations were completed after extensive consultation with the local Trappers' Association and other interested parties.

The Bison Research Program continued into its second year. A biophysical land classification was initiated.

Environmental impact assessments of Carlson's Landing and Pine Lake were completed. Work began on the design of the Pine Lake Area Development Plan. A study to assess potential sites for road-side facilities was conducted.

Efforts to increase native involvement in the Interpretation program were initiated along with an increased effort to take the park message into the community through the extension program.

Plans for 1977-78

The interpretive program will be expanded with plans providing for programs in Cree and Chipewyan. The extension program will be expanded to include interpretive information on Pacific Western Airlines flights over the park.

Bison research, the biophysical land assessment and the Peace Athabasca Monitoring Program will continue. An environmental impact assessment will be conducted at Nyarling Landing, a possible visitor use area.

The Pine Lake Area Development Plan will be finalized and preliminary development will begin.

Auyuittuq National Park

Review of 1976-77

The following work was done in the park: creation of a 35 km hiking trail from Overlord to Summit Lake; construction of two wooden bridges and installation of two cables spanning the Weasel River; placing of markers on trails to protect fragile areas of the park; cleaning-up and improvement of lands surrounding administration buildings at Pangnirtung and Broughton Island; the project to clean-up the former DEW Line military base at Kivitoo is proceeding as planned and will continue over the next few years; this is due primarily to the area's inaccessibility and the quantity of material left behind when the base was abandoned;



Virginia Falls, Nahanni National Park

construction of a residence at Pangnirtung for a permanent park warden; development of a primitive campground at Overlord near the park's entrance is proceeding as planned. The campground now contains twelve sites, each with picnic table, fireplace, firewood box and two toilets. In addition, 3.6 x 4.8 m tents have been set up on wooden platforms to provide visitors with temporary accommodation; two emergency shelters were built and installed at Overlord and Windy Lake to serve as stations for seasonal wardens on duty in the Pangnirtung Pass sector; three toilets were built, and installed near huts north of Pangnirtung Fjord and at Owl River Valley; the third was transported to Windy Lake.

All work was carried out under contract with the local population of Pangnirtung and Broughton Island. Several contracts were signed with the local hunting and fishing association and with the Pangnirtung Co-operative. Some \$45 000 was paid out to local Inuit contractors.

In the area of natural resource conservation, several activities are continuing, including studies in hydrology and climatology and the preparation of basic maps. Wardens offered assistance to researchers from the Institute of Arctic and Alpine Research conducting Phase II of a glaciology project. They were also able to assist researchers from Laval University in carrying out an hydrology project.

Close relations were maintained with both regional and local representatives of the Government of the Northwest Territories, including the Commissioner and his staff.

From time to time wardens work with territorial officers in charge of wildlife conservation and very often offer technical assistance to the local association of hunters and fishermen of Pangnirtung.

Several informal meetings with Inuit from various surrounding villages took place to explain park objectives and policies and native rights. The local population has expressed its appreciation of the park's radio network for use in emergencies.

Seven Inuit make up the park staff, three in permanent positions and four in seasonal positions. Since it is difficult to recruit qualified personnel, it is necessary to train newcomers to ensure qualified service. Two wardens went to Jasper to take various courses in the enforcement of park laws and regulations. One clerk is training at Ottawa as part of the Northern Careers Program. Once this training period is completed, he will work at several parks in the south before returning to Auyuittuq. During his absence, another Inuit employee will be in orientation training at the administration office. The park's rate of staff turnover, though rather high, is nevertheless lower than most other regional or local organizations.

Listed below are visitor statistics:

Total number of park visitors 645
 Total number visiting administration office and exhibit room 1182
 Total number of Inuit/visitors to Park (registered visitors only) 2725
 Places visited: Pangnirtung Pass from Overlord along Weasel River to Summit Lake; and the Glacier Lake region.

Plans for 1977-78

The following work will be done:

formulation of master plan;
 study concerning possible accommodation for visitors to Pangnirtung and Overlord;
 construction of two emergency shelters in Pangnirtung Pass;
 extension of hiking trails;
 installation of new wooden cablebridges over rivers;
 feasibility study on new campground;
 improvement of signs and markers;
 various inventories of natural resources: aerial photographs; basic maps; hydrology study (Phase II); and description and mapping of natural resources;

continued clean-up work on former military base at Kivitoo; and study on preservation of historic whaling post at Kivitoo.

Proposed Pingo National Landmarks, Tuktoyaktuk Peninsula, NWT

Review of 1976-77

Meetings were held with Imperial Oil Enterprises in 1976 regarding the relinquishment of the company's oil and gas permits for the area in the Pingo proposal. Agreement was reached on extinguishment of interest by I.O.E., however, it was decided not to pursue the landmark proposal pending a regional analysis study of Natural Region 10. This study will seek to identify a representative Natural Area of Canadian Significance (NACS) within which the original unique landmark area might be encompassed.

Plans for 1977-78

A regional analysis study of Natural Region 10 will be undertaken in 1977. Results of the study may indicate that the landmark proposal should become part of a more comprehensive national park study.

Future National Park, Great Slave Lake, NWT

Review of 1976-77

An area of 7 407.4 km² around Fort Reliance on the East Arm of Great Slave Lake was set aside in 1970 as a future national park. The five year assessment period to allow the Snowdrift Band to examine the effects of the park has expired and no response was received from the Band.

National Historic Parks and Sites Branch

Responsibilities

To commemorate those places, persons or events north of 60° recognized to be of national historic importance. This area consists largely of the Northwest and Yukon Territories and commemoration involves consultation with the governments of the territories.

Klondike Historic Sites

Review of 1976-77

The Parks Canada Dawson City Planning Team has completed the provincial master

plan for Dawson City, Bear Creek and the Klondike Gold Fields, collectively called the Klondike Historic Sites. Included in the proposals are recommendations related to commemoration, the preservation of historic resources, infra-structure requirements, possible co-operative activities with other government agencies and program implementation under different levels of funding. The provisional master plan was reviewed.

Development efforts during the year focused on preventative maintenance and the stabilization of historically significant structures.

Parks Canada is considering the socio-economic impact of historic development on Dawson City and has consulted with the city, the Yukon Territorial Government and the department.

Plans for 1977-78

The master plan for Dawson City is scheduled for completion toward the end of 1977. Prior to this time, the proposal will be presented to the public through either a series of public meetings, the drop-in centre in Dawson City or both.

In addition to the administration of historic resources open to the public: the S.S. Keno, the old Post Office, the Palace Grand Theatre, Robert Service Cabin and Dredge No. 4; research and resource protection activities will continue. Special emphasis will be placed on the stabilization of buildings, archaeological and historical research and the identification and conservation of artifacts. Major commemoration and restoration projects are pending subject to the approval in the master plan.

S.S. Klondike

Review of 1976-77

Repair and stabilization of the hull of the S.S. Klondike and investigation and stripping in the galley continued. Design of the wheelhouse was completed. Acquisition and replication for period furnishing began as was the reproduction of table linens, replication of life jackets and label reproduction for packaged goods.

Plans for 1977-78

Restoration of the S.S. Klondike will continue. A task force has been established to develop a work program for this site to facilitate the co-ordination of activities and to prepare terms of reference for a detailed site development plan.

The possibility of providing interim facilities in order to provide interpretation of the resto-

ration process is being studied by the task force.

Chilkoot Trail

Review of 1976-77

The brochure for the Chilkoot Trail was completed and distributed.

Negotiations were carried out with officials of the Province of British Columbia regarding the development of a draft agreement for the transfer of land.

Plans for 1977-78

Some revisions to the Chilkoot Trail brochure will be made for the 1977 operation. It is anticipated that final agreement will be reached between the Province of British Columbia and Parks Canada for the land transfer.

Agreements for Recreation and Conservation (ARC)

Responsibilities

The mandate of the ARC Branch is to ensure the preservation of areas that contain nationally significant natural and human heritage resources. Implementation of the mandate is accomplished through co-operation with federal, provincial and/or other agencies in the identification of heritage areas and through agreements in the planning, development, preservation and operation of the area's resources. Emphasis is placed on developing facilities of historical, scenic and cultural significance.

The object of an ARC agreement is to define the required developments, then assign jurisdiction responsibility and allocate costs among the participating agencies.

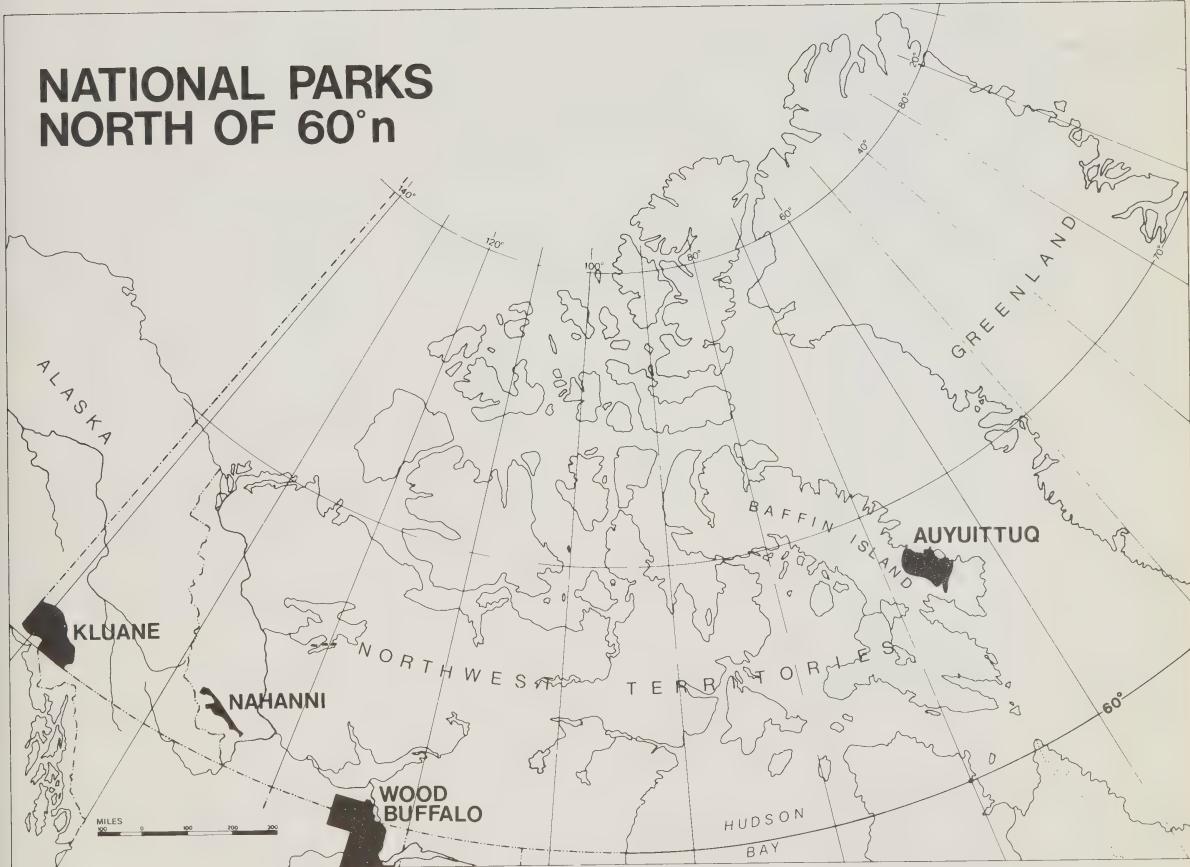
Review of 1976-77

Activities have been restricted to a continuing review of potential ARC involvement on behalf of Parks Canada in the Yukon River portion of the Klondike Gold Rush International Historic Park and an inventory of resources available to ARC involvement in the Mackenzie River Valley. Both activities are long-term and depend largely on the actions of other agencies which have development priorities. No conclusion for ARC involvement was reached.

Plans for 1977-78

ARC is a federal-provincial program requiring a formal Agreement for its implementation. During 1977-78, ARC will continue working toward a rationale for its use in the territories, recognizing its special federal-territorial relationships.

NATIONAL PARKS NORTH OF 60°n



Department of Justice (JUST)

Responsibilities

The department's responsibilities include the appointment of judges to the Territorial Supreme Courts and the direction of court proceedings on behalf of the Crown including prosecutions under the Criminal Code and other federal statutes. The department has also a shared responsibility for the cost of legal aid, native courtworker and compensation to victims of violent crimes programs in the Northwest and Yukon Territories.

Review of 1976-77

Payments totalling \$160 736 were made to the Northwest Territories representing the federal share of a) the cost of legal aid (\$70 000) b) the cost of the compensation to victims of violent crimes program (\$16 411), both for the year ending March 31, 1976, and c) the cost of the native court-worker program for 1976-77 (\$74 325).

Payments totalling \$7 500 were made to the Yukon Territory representing the federal share of the cost of the native courtworker program in 1976-77.

An agreement was signed with the Yukon Territory to provide for cost-sharing of legal aid, effective April 1, 1976.

The department and the Government of the Northwest Territories continued to cost-share an experimental community legal services project in Frobisher. Payments totalling \$47 667 were made for the project's 1976-77 operation.

Plans for 1977-78

The department and the Government of the Northwest Territories are continuing the comprehensive review, undertaken in 1976-77, of the present federal-territorial legal aid agreement and program, and of the Frobisher legal services centre which will continue to receive departmental contributions in 1977-78.

Labour Canada (LAB)

Responsibilities

The role of Labour Canada is to promote and protect the rights of parties involved in the world of work; a working environment conducive to physical and social well-being; a fair return for efforts in the workplace; and in all cases ensure equitable access to employment opportunities.

To help meet the many challenges facing a labour ministry, Labour Canada is reorganizing and has already decentralized into five regions:

Atlantic Region, Moncton headquarters, embraces the three Maritime provinces and Newfoundland;

St. Lawrence Region, Montreal headquarters, serves all of Quebec;

Great Lakes Region, Toronto headquarters, encompasses the greater part of Ontario; *Central Region*, Winnipeg headquarters, includes Saskatchewan, Manitoba, and Northwestern Ontario;

Mountain Region, Vancouver headquarters, takes in British Columbia, Alberta, the Yukon, and the Northwest Territories.

The regions, have primary responsibility for the delivery of departmental programs with a requirement for strong inputs into headquarters regarding research and policy development, program design and evaluation.

Mediation and Conciliation Services

Review of 1976-77

The Mediation and Conciliation Branch, with the assistance of conciliation officers, conciliation commissioners, conciliation boards, mediators and industrial relations consultants, has the responsibility for providing third-party services to labour and management, covered by the federal jurisdiction of the Canada Labour Code (Part V) (including territorial jurisdiction) in the settlement and adjustment of collective bargaining and other types of industrial relations disputes, which can result in breakdowns in labour/management relationships, resulting in instability and socio-economic losses.

Summary of Activities 1976-77

[Number of activities in square brackets]

Disputes referred to Conciliation Officers pursuant to Section 164(1)(a) of the Code [5];

Disputes referred to Conciliation Commiss-

sions pursuant to Section 166(a) of the Code [1];

Disputes referred to Conciliation Boards pursuant to Section 166(b) of the Code [Nil];

Disputes referred to Mediation pursuant to Section 195 of the Code [2].

Mountain Region

Mountain Region administered part III of the Canada Labour Code (Labour Standards) and the Fair Wages and Hours of Labour Act during 1976-77 as follows.

Federal Contracts

Inspections on Government Contracts

During 1976-77 seven inspections (four in NWT, three in Yukon) were carried out by Labour Affairs Officers. Wage adjustments totalling \$3 025.65 were collected from four contractors and 27 employees. Additional inspections on northern contracts were conducted at contractors' head offices located in Edmonton and Calgary.

Wage Schedules Issued —

	NWT	YT
Construction Contracts	80	20
Service Contracts	6	5

Annual construction wage surveys were conducted in the Yukon and Northwest Territories to provide data sufficient to establish prevailing wage rates for inclusion in Labour Conditions Schedules for Federal Government Contracts.

In addition, a special survey was conducted to determine prevailing wage rates for the contract with Tower-Foundation to operate the airport for the Ministry of Transport at Resolute Bay.

Part III of the Canada Labour Code (Labour Standards)

The provisions of Part III of the Canada Labour Code (Labour Standards) do not apply to a work, undertaking or business of a local or private nature in the Yukon or Northwest Territories. Part III of the Code does, however, apply to those kinds of businesses that normally come within federal jurisdiction when located in the provinces.

During 1976-77, 13 complaints were investigated under Part III of the Canada Labour Code (Labour Standards), ten in the Yukon and three in the Northwest Territories. As a

result 15 violations were corrected and the sum of \$2 842.95 recovered.

Complaints from employees in the Northwest Territories were resolved by investigations conducted at head offices in Edmonton and Calgary of firms operating in the Northwest Territories.

Eleven routine inspections were carried out in the same period and no violations were found. Inspections are based on complaint load and the need for information to prepare fair wage schedules. Routine inspections are conducted in concordance with available resources and commitments.

Part I of the Canada Labour Code (Fair Employment Practices)

During 1976-77, five complaints were investigated in the Northwest Territories relating to Fair Employment Practices involving the provision of subsidized housing; failure to rehire due to colour; dismissal alleged to be due to race; and one alleged discrimination due to racial origin. None of the complaints was found to involve fair employment practices although other violations were found and corrected.

Part IV of the Canada Labour Code (Safety of Employees)

The long-term objective in the territories is the implementation of a comprehensive employment safety program on premises of employers subject to Part IV of the Canada Labour Code (Safety of Employees) as well as in the Public Service of Canada under the authority of the Occupational Safety Policy. Under the authority of Part IV, the department is responsible for having employers maintain safe and healthy working conditions in federal works, undertakings and businesses. In the federal Public Service, the department acts as an agent of Treasury Board in the development and improvement of safety programs and in monitoring existing programs in accordance with the occupational health and safety policies.

Summary of Activities

Safety visits involving inspections, surveys, safety audits, program development or accident investigations were held in the Northwest Territories as follows:

Location	No. of Safety Visits
Inuvik	4
Tuktoyaktuk	1
Norman Wells	3
Strutt Lake	4
Yellowknife	15
Hay River	2
Baker Lake	5
Total Safety Visits	34

Occupational Safety and Health Inspections in the Yukon involved the following:

Canadian National Telecommunications
National Health and Welfare
Indian Affairs and Northern Development
Post Office
Public Works Canada
Transport Canada
National Revenue, Customs and Excise
Northern Canada Power Commission

Two fatal accidents were investigated. An employee of Northern Transportation Company Limited fell while leaving the cab of a fork lift at Baker Lake, NWT, and an employee of Northern Canada Power Commission was struck by rock during a loading operation.

The department has been working with Northern Canada Power Commission to improve their safety performance. The new general manager has instituted a number of changes to improve safety and reduce accidents.

A number of meetings were held in Edmonton with senior management of federal companies, crown corporations and public service departments concerning safety program management in the North. Safety training for the agents and managers of Northern Transportation Company Limited was provided.

The federal-territorial agreement for the inspection of boilers and electrical facilities will continue with federal funds to help underwrite the cost of inspection services to residents of the Northwest Territories. The agreement for the enforcement of the Canada Motor Vehicle Operators Hours of Service Regulations by the territorial weigh scale operators is still operating with some labour difficulty and other problems not related to the agreement. Elevator inspections in the Northwest Territories are provided under the general authority of the agreement.

Technical inspections in the Yukon were conducted as follows:

Elevating Devices – 6 units – June 1976

Boilers and Pressure Vessels – 55 units – June/July 1976

Labour Affairs

The Regional Director, Mountain Region, Labour Canada, and a labour affairs officer from the Vancouver office visited the Yukon Territory from July 5 to 22, 1976, to conduct meetings with representatives of the following federal enterprises and federal public service departments:

Northern Canada Power Commission
White Pass and Yukon Route
Yukon Contractors Association
Yukon Territorial Government
National Health and Welfare
Transport Canada (Air Service)
Indian Affairs and Northern Development
Public Service Alliance
United Steelworkers
Tunnel and Rock Workers
Cement Mixers
Teamsters
Carpenters, Plumbers and Building Trades
Beverage Dispensers and Culinary Workers

Plans for 1977-78

With the greater flexibility of the Labour Affairs Officer over the labour specialist, a somewhat greater penetration of the spectrum of labour relations for a similar or slightly increased expenditure of resources is expected.

During 1977-78, Labour Canada will continue to work in the territories to minimize accidents and increase the level of employment safety to that of the rest of Canada; to conduct surveys as necessary so the Fair Wage Schedules can be developed to apply to government contracts; respond to complaints and conduct such inspections and surveys in accordance with available resources.

Rights in Employment Branch

The Fair Employment Practices Branch and Women's Bureau are now divisions under Rights in Employment Branch. Part I of the Canada Labour Code (Fair Employment Practices) is administered in the Yukon and Northwest Territories by the department's regional office in Vancouver. The Rights in Employment Branch maintains programs in relation to future human rights developments and establishes new programs and policies designed to ensure that all individuals have fair and equal opportunities to obtain employment, receive promotions and get fair and equal treatment on the job.

During 1976-77, a few complaints relating to territorial Fair Employment Practices ordinances or other labour matters under territorial jurisdiction were received and the complaints referred to the appropriate territorial administration. The Women's Bureau, continued to provide a consultative and information service on matters directly related to the objectives of the bureau.

Plans for 1977-78

The Branch through its officers will continue to provide assistance and be involved as a permanent member of the Sub-Committee for the Employment of Native Peoples in the North of the Advisory Committee on Northern Development.

Accident Compensation Division

Claims of federal government employees, employed in the Yukon and Northwest Territories, on compensation for occupational injuries or diseases were received in the Branch, certified and forwarded to the Workers' Compensation Board of Alberta for adjudication and payment under a federal-provincial arrangement. During 1976, 404 claims were received and approximately \$226 750 in disbursements made.

Library and Information Services

The Legislative Analysis Unit of Library and Information Services provides an information and advisory service concerning industrial relations, labour standards, occupational safety and health, workers' compensation, apprenticeship and tradesmen's qualifications and human rights legislation.

Territorial ordinances are analysed and published in summary form along with new enactments of other Canadian jurisdictions, in such regular publications as the *Legislative Review*, *Labour Standards in Canada*, *Women's Compensation*, *Human Rights in Canada*, *Legislative Notes* and the *Labour Gazette*.

Labour Data Branch

The Labour Data Branch carries out an annual survey of wages, salaries and certain conditions of work in establishments having 20 or more employees. The October 1, 1976

survey included 64 establishments in the Yukon Territory and 71 establishments in the Northwest Territories. The survey will be continued in 1977.

Information on work stoppages due to strikes and lockouts in the territories is maintained on a continuing basis. In 1976, six work stoppages were reported, involving 1 620 workers and time loss of 65 180 man-days.

A report on labour organizations and union membership, which includes the territories, is published annually. In 1975 there were 45 union locals with a membership of over 6 700.

The Branch maintains a comprehensive record of collective agreements which include some agreements covering employees in the Yukon and the Northwest Territories. Of these, 82 collective agreements covered some 7 150 employees in the territories.

Department of Manpower and Immigration (M&I)

Responsibilities

The fundamental purpose of the department is to further the economic and social development of Canada by meeting the needs of employers and workers across Canada. It endeavours to achieve this through the application of wide-ranging programs and services, including a network of strategically located Canada Manpower Centres, professional counselling, recruitment services, training programs, relocation assistance, control of non-immigrant workers, industrial adjustment assistance and programs for people with special needs.

Yukon Territory

The Director of Manpower, Whitehorse, reports to the Director, Manpower-Pacific Region, Department of Manpower and Immigration, Vancouver, British Columbia.

Northwest Territories

The Director of Manpower, Yellowknife, reports to the Director General, Alberta, Department of Manpower and Immigration, Edmonton, Alberta.

Federal-Territorial Relations

Yukon and Northwest Territories

The basic principle of federal-territorial relations is to provide adequate consultation in the policy development process on manpower matters. To facilitate consultation, the Manpower Needs Committees in the Yukon and NWT met a number of times during the year. The Director of Manpower, in each territory, is co-chairman of the corresponding committee, which has representation from several departments of the territorial and federal governments.

Review of 1976-77

Yukon Territory

The department continued to focus on the improvement and extension of services to outlying areas of the Yukon. Each community was visited at least once by a staff member. In addition, Outreach workers, strategically placed throughout the Yukon, provided CMC services, to their local labour forces. This joint effort focused on the overall delivery of services to employer and employee clients, including special needs clients and the gen-

eral provision of assistance and information related to manpower services.

The Canada Manpower Service to Employers Program was maintained throughout the year to encourage employers to upgrade their labour force, primarily through training; and to develop effective methods for the recruitment of workers to ensure maximum utilization of the Yukon labour force. This was accomplished through personal visits to employers, liaison with memberships in organizations, and involvement with northern committees.

Activities associated with the Manpower Assessment Incentive Agreement between the White Pass and Yukon Corporation Limited, two locals of the Teamsters Union, the Yukon Territorial Government and this department were concluded in 1976-77. Results included the establishment of a climate conducive to change, establishment of a company training centre, the development of a training program to meet specific needs and a better understanding by management and workers of their responsibilities to the corporation, the work force and the Yukon economy.

A Manpower Assessment Incentive Agreement between Cassiar Asbestos Corporation Limited, the Canadian Mine Workers and this department was negotiated late in the year by the Canada Manpower Centre-Whitehorse and specialists for the Manpower Consultative Service. The objective of this agreement includes the orderly redeployment of the hourly paid work force at Cassiar Asbestos Corporation, Clinton Creek Mine, tentatively scheduled for closure in late 1978.

The 1976-77 Summer Student Employment and Activities Program was operated from January to September, 1976. A graduate student was hired in January to manage this operation, to contact all post-secondary Yukon students, to co-ordinate the Yukon Territorial Government's student hiring program and to identify student employment opportunities in the private sector. As a result, many of the Yukon's post-secondary students had pre-arranged employment upon their return to the Yukon.

In addition, three under-graduate students were also hired for the program to provide assistance to Yukon secondary school students and other Canadian students seeking summer employment. Student activities included visits to Yukon employers who could employ students and to guidance classes in secondary schools to outline summer employment. A public relations program directed at employers was undertaken to encourage the hiring of students during the summer break.

The year-round program includes counselling and placement services, creative job search techniques courses, assistance to secondary school guidance counsellors, and participation in Career Days and related career-oriented school activities.

In January 1977, the 1977-78 Summer Student Employment and Activities Program started with the recruitment of a graduate student to implement the program. The overall objectives and methods of operations remain the same as in previous years. The Job Information Centre operated throughout the year.

The Canada Manpower Centre, the Canada Immigration Centre and the Unemployment Insurance Commission are locating in 1978-79 in one building in preparation for integration of services.

The permanent Canada Immigration Centre, established April 1, 1975, provides valuable services. More than 7 033 worker clients registered in CMC Whitehorse in 1976-77. A total of 6 105 referrals were made to known job vacancies and 2 434 clients were employed. A total of 16 011 counselling interviews were held and 574 counsellor visits were made to employers.

Northwest Territories

The Northwest Territories were serviced by fully autonomous Canada Manpower Centres in the communities of Yellowknife, Hay River, Inuvik, and Frobisher. Two full-time sub-offices were maintained at Fort Simpson and Fort Smith. Itinerant services were provided to all of the larger settlements in the NWT.

The Canada Manpower Centre at Yellowknife and its branch offices serve about 30 settlements with a total population of over 20 000. This office with a staff of 22 is responsible for approximately two-thirds of the area of the NWT; 3 379 698.7 km² or one-fifth the area of Canada. Services of the CMC were largely directed toward the government offices in Yellowknife and the major mines in the NWT, including two large gold mines at Yellowknife. The Canada Manpower Centre at Inuvik is responsible for an area of approximately one-sixth of the territories and services about 12 settlements with a combined population of more than 6 000. The CMC is primarily concerned with activity generated by petroleum exploration and construction of the Dempster Highway.

The Canada Manpower Centre at Frobisher is responsible for about one-sixth of the area of the NWT. About 24 settlements, with a

combined population of more than 8,000 were served. The staff of four is concerned with employment in the Baffin Region, largely a hunting and trapping area; and with the development of a new lead/zinc mine at Strathcona Sound.

The Canada Manpower Centre at Hay River is accountable for all of the market activity in an area of about 77 700 km². During the past year, the CMC has concentrated on employers' needs in four major communities with emphasis on the transportation and mining industries. The CMC at Hay River serves a population of approximately 6 500.

The department provides an economic analysis capability for the NWT related to planning and human resource development and utilization.

More than 8 000 worker clients registered with CMC in the NWT in 1976-77 with more than 7 000 job referrals made and 3 000 workers employed. More than 16 000 counselling interviews were held and 800 counselor visits were made to employers.

Canada Manpower Training Program (CMTP)

Yukon Territory

The department is involved in and supports virtually all vocationally oriented courses offered by the Yukon Territorial Government through the Yukon Vocational and Technical Training Centre. The emphasis is on basic training for Skill Development courses in outlying communities. These community courses are directed primarily toward the Indian population with the twofold objective of increasing social and academic skills and providing the necessary prerequisites for entering the labour force or other vocational training courses. Under the terms of the Adult Occupational Training Act Agreement, the department and the Yukon Territorial Government continue to consult, co-ordinate and plan training activities within their respective jurisdictions.

During 1976-77, a total of about 47 000 training days were purchased under the AOTA Agreement. This represents 609 training spaces as follows: Basic Training for Skill Development, 150; Skill full-time, 301; and Skill Part-time, 158. About 600 trainees are expected to benefit from CMTP sponsorship. A small number of trainees were referred to

outside training institutions, primarily in British Columbia.

The Canada Manpower Industrial Training Program continues to be successful in upgrading the existing work force, alleviating the shortage of skilled labour in the Yukon, providing employers with financial incentives for hiring and training unemployed and special needs clients. During the year, approximately 486 Yukon workers were trained under the program which involved 77 training contracts with employers and associates. Although the majority of the training provided under the program benefited the employed worker, emphasis will continue on increasing the proportion of unemployed and special needs clients trained. In 1976-77 this program encountered difficulties in the mining and transportation industries, due to the multitude of labour disputes and the resultant spin-off effects on support industries.

Northwest Territories

The Canada Manpower Training Agreement formulated on October 30, 1974 with an expiry date of March 31, 1977 has been extended for one year.

The Agreement emphasizes a basic principle that manpower training programs can be fully effective by consultation and co-operation between the federal and territorial government in planning and implementing the program. The development of comprehensive training programs with industry will be encouraged and stimulated by the federal government. The planning of training activities within the terms of the agreement is a major function of the Manpower Needs Committee.

In 1976-77, the department purchased 69 043 training days: skill — 24 741; apprenticeship — 8 638; academic upgrading — 35 664. A total of 1 157 trainees were referred to various courses: skill training — 351; apprenticeship — 268; academic upgrading — 538.

The Canada Manpower Industrial Training Program continues to be successful in upgrading the existing work force to alleviate shortages of skilled labour in the NWT and to provide employers with financial incentives necessary to hire and train unemployed and special needs clientele.

In 1976-77, 116 industrial training contracts provided training opportunities for 278 people. Emphasis in this area will continue as advertising of the program brings results.

In an effort to be more sensitive to the employment and training needs of industry, the department participates on several com-

mittees, the Nanisivik Employment and Training Advisory Board, the Chamber of Mines, and others.

Canada Manpower Mobility Program (CMMMP)

Yukon Territory

Under this program workers continued to explore and relocate to jobs away from their place of residence, to accept temporary jobs in other areas and to travel to Canada Manpower Centres to take advantage of services not available in the worker's home area. Mobility assistance is paid to Canada Manpower Training Program trainees who are required to travel to participate in courses. During the year, 11 relocation grants, 33 exploratory grants and 407 temporary employment grants were authorized in the Yukon.

Northwest Territories

During 1976-77, 106 various mobility grants were authorized. This does not outline all the mobility activity, the Canada Manpower Centres in the NWT received into their areas of responsibility approximately 26 workers coming to employment opportunities with the assistance of the Canada Manpower Mobility Program.

Job Creation

Yukon Territory

Local Initiatives Program (LIP)

There were 25 LIP projects in the Yukon in 1976-77 operating with a federal contribution of \$542 202. Employment was provided for 147 workers (2 716 man-weeks) in a variety of areas including construction, repair, recreational, social and community service activities.

Local Employment Assistance Program (LEAP)

Local Employment Assistance Program Projects active in 1976-77 in the Yukon were as follows:

Remedial Tutor Training Program — This program, sponsored by the Yukon Association for Children with Learning Disabilities and operated with support and consultation from the Department of Education, Government of the Yukon, reached its third and final year of funding in 1976-77. The purpose of the pro-

gram was twofold: to provide training and employment for status and non-status natives as remedial tutors in selected Yukon elementary schools; and, secondary to the remedial tutoring program, to upgrade the basic reading, language and arithmetic skills of elementary school children. During 1976-77, the project employed 18 workers (936 man-weeks) with a federal contribution of \$197 618.

Yansi Teslin Wood Products — This project recommended operation in 1976-77, after a work stoppage of one year. Its activities involved on-the-job training in carpentry, boat building, production techniques, machinery operation and product design through the production of cedar strip freighter canoes, sleighs, toboggans, and snowshoes for retail sale. Sponsorship of the project changed from the Yukon Association of Non-Status Indians to a limited native corporation with the Teslin Indian Band. During 1976-77 the project employed eight workers (336 man-weeks) with a departmental contribution of \$70 868.

Other activities under the Local Employment Assistance Program involved development of proposals and subsequent investigation of economic viability. At least one of the proposals may result in activity during 1977-78.

Northwest Territories

Local Initiatives Program (LIP)

During 1976-77, 46 LIP projects, varying from a local newspaper operation to preventive special services, created 414 jobs. Total funding for the program amounted to \$956 977.

Local Employment Assistance Program (LEAP)

Three projects operated in the NWT and will continue to receive support in 1977-78. The total federal contribution to date has been \$358 000. An example of a LEAP project and its objectives is well identified by Inuit Pitqosii: *Objectives*: Through Inuit Pitqosii, Inuit people will produce kits of Eskimo toys, games and sewing items. These kits will be used in schools and other places in both northern and southern Canada to encourage Inuit and other children to learn about Inuit culture. The objective is to provide an alternative economic activity to geographically isolated Inuit of Baker Lake with the intention that Inuit Pitqosii eventually become self-sufficient.

Activities: Inuit Pitqosii employs six people in the capacities of manager-trainee, bookkeeper, two crafts trainers and two crafts

trainees. A management consultant has been hired for several months. All revenues earned through sales of Inuit Pitqosii kits will be applied to project costs and/or used to build up a working capital sufficient to allow the project to continue operating at the end of LEAP funding.

Special Programs

Yukon Territory

The Yukon Outreach Project continues to aid the extension of Canada Manpower Centre services to various communities throughout the Yukon. Management and administration staff of the Yukon Outreach Project are located in Whitehorse with Outreach workers located at Whitehorse, Carmacks, Mayo, Dawson City, Ross River, Watson Lake and Haines Junction. The target population for the Yukon Outreach Project includes all workers who have difficulty utilizing Canada Manpower Centre services, with particular emphasis on employment of Indian people. Outreach workers are engaged in various activities designed to resolve unemployment and related problems in their communities. Liaison and co-ordination with several community agencies and groups was established and maintained.

Outreach Workers were delegated staffing authority for the various Local Initiative Program projects in their communities and were utilized by the Public Service Commission of the Yukon Territorial Government to identify and refer workers for consideration in positions that exist in outlying communities. Close co-operation and co-ordination continues between the Yukon Outreach Project and the Canada Manpower Centre in many of the day-to-day activities of both organizations.

Northwest Territories

Two Outreach projects have been initiated this year bringing to 10 the number of projects in the NWT. The Outreach Program is proving a viable means for bringing Manpower programs and services to the isolated communities. Continuing efforts have been made to establish a closer and more functional working relationship between the projects and the CMC. These efforts have been successful in more effective delivery of service to the projects' target groups.

The projects and the CMC have established mutually supportive roles. The projects have become sources of labour market infor-

mation and the delivery point of programs and services. The CMC has provided a technically supportive role in the delivery of programs and services. The Outreach Program is a means for the CMC to make employment and training opportunities available to natives with increased itinerant services.

During the year, the CMC has strengthened liaison with secondary schools in their areas. On-line programs and services such as CJST, career counselling, school liaison, committees, services to dropouts, and the Student Summer Employment Assistance Program have been more aggressively marketed and implemented.

The new strategy for Services to Youth will be introduced into the NWT in 1977-78. The new programs and services available will improve in quality and quantity of services to the youth labour force (ages 15-24).

Services to other special client groups such as inmates, women and the mentally and physically handicapped have increased, although less significantly.

Plans for 1977-78

Yukon Territory

The department intends to continue to emphasize the extension of services to all areas of the Yukon to:

- expand the scope of services through present programs;
- continue to examine possible ways to co-ordinate and integrate the delivery of Canada Manpower Centres and related services to special groups of workers;
- continue to support the activities of the Yukon Outreach Project in order to reach workers not adequately served by the Canada Manpower Centre;
- continue to ensure that employers are aware of departmental services available to them so they can obtain, retain, and upgrade their work force. Emphasis will continue to be placed on the utilization of the Yukon labour force to meet Yukon demand;
- continue to emphasize the utilization of the Canada Manpower Industrial Training Program to upgrade the skills of special needs, unemployed and employed workers;
- continue to utilize the Canada Manpower Training Program to train, retrain, and upgrade workers through the facilities of the Yukon Vocational and Technical Training Centre and other training institutions, as appropriate;
- continue to utilize the Canada Manpower

Mobility Program to full advantage to meet the needs of the Yukon labour force; institute a full-time youth service from the Canada Manpower Centre to ensure Yukon youth receive proper and timely information and assistance in career planning and employment related topics; continue planning in consultation with departmental officials for the integration of Manpower and Immigration and Unemployment Insurance Commission services; continue to prepare for a delivery system and training strategy in the event of an Alaska Highway Pipeline Project.

Northwest Territories

The department plans to strive for further expansion of program delivery in the NWT. Access to CMC services for more residents will be provided via the following major thrusts:

establishment of a CMC at Rankin Inlet to serve as a focal point for services in the District of Keewatin; investigation of establishing a permanent CMC to serve the Central Arctic Coast area (i.e. Cambridge Bay – Resolute Bay); optimum utilization of Outreach projects; aggressive itinerant service to those settlements not adequately serviced by the CMC or Outreach.

The department will continue efforts to improve the provision of service and employment opportunities, both externally and internally, for native people. Plans for the establishment of the Work Adjustment Program and implementation will be completed. The Manpower Needs Committee membership structure will be reviewed and new avenues of involvement explored.

The department expressed an overall strategy in the event of a Mackenzie Valley Pipeline in a brief to the Berger Commission Inquiry. Finalization of a Manpower Delivery System for the pipeline will be brought to the operational readiness phase for implementation.

During 1977, the Department of Manpower & Immigration may be integrated with the Unemployment Insurance Commission to form the Canada Employment and Immigration Commission. This union will provide clients with a more comprehensive concept to aid northern employment.

Department of National Defence (DND)

Canadian Forces

Defence Policy Relative to the North

Responsibilities

The government has defined national aims and policy themes and has listed major areas of activity as guidelines to federal departments and agencies to govern their activities during the 70s. Of these, the following are relevant to national defence activities and responsibilities in the North:

National Aim — Canada will continue secure as an independent political entity;

National Policy Theme — to safeguard sovereignty and independence; and

Canadian Forces Activities — the surveillance of national territory and coastlines, ie, the protection of sovereignty; the defence of North America in co-operation with US forces; and contributions to national development.

The government's objective to exercise Canadian sovereignty and ensure security in the North requires an effective presence in the northern territories and a surveillance and control capability to safeguard national interests in the territory, airspace and waters over which Canada claims sovereignty or jurisdiction. As the Defence White Paper of 1971 makes clear, the Department of National Defence provides the means necessary:

to supplement and support the civil departments and agencies of government in discharging their responsibilities for the protection of Canada both against domestic challenges to its internal security and against external challenges to its territorial integrity (including the integrity of Canadian territorial sea and airspace) and to its jurisdiction both under national and international law; and

to contribute to those collective security arrangements through which DND hopes to secure Canada from the consequences of nuclear war and of a strategic nuclear attack on North America.

The roles assigned to the Canadian Forces contribute to the protection of northern Canada and to its security from attack generally in much the same way as they do for Canada as a whole. It is principally in the performance of two of these roles — that relating to the protection of our sovereignty, and that relating to the defence of North America — that the need could arise for the Canadian

Forces to engage in military activities in the North.

To assure the security of Canada against external threat, Canada continues to honour its commitments and to contribute to the collective defence of North America. (Canada participates in military activities conducted under the aegis of the North American Air Defence Agreement (NORAD), Canada/United States Land Operations and the appropriate Maritime Operational Plans.) Various installations in the North are maintained in support of these activities.

Surveillance and control, whether undertaken to support or supplement the work of other departments and agencies or for reasons of national security, are tasks for which the Department of National Defence is required to maintain appropriate capabilities. The Department of National Defence has the responsibility to assist other government departments and agencies, when required, to enforce Canadian law.

The Department of National Defence provides in the North those services such as search and rescue and assistance in the event of natural or man-made disaster. The Canadian Forces have mobility, flexibility and a great range of skills, specialties, and equipment that are especially relevant in the North.

Personnel

The department, through its recruiting offices in Vancouver, Edmonton, Winnipeg and Montreal, conducted a series of three tours of the Yukon Territory, Northwest Territories and Arctic Quebec in order to ensure that northern residents were made aware of employment opportunities and career prospects in the Canadian Forces. Nineteen communities were visited by the recruiting teams to provide employment and career briefings. The selected communities of Whitehorse, Watson Lake, Faro, Carmacks, Mayo, Dawson City, Coppermine, Cambridge Bay, Hay River, Fort Smith, Fort Simpson, Inuvik, Yellowknife, Churchill, Baker Lake, Rankin Inlet, Great Whale River, Fort Chimo and Frobisher were visited resulting in 1 849 persons attending presentations and 46 applications for enrolment. These visits have resulted in a growing awareness among native northerners of the opportunities available within the Canadian Forces.

In addition to the recruiting tours, a course in heavy equipment operation was conducted for six northern natives from Rankin Inlet by the Canadian Forces School of Military Engineering. All trainees were successful and re-

turned to Rankin Inlet to take up employment as heavy equipment operators.

Review of 1976-77

Maritime Forces

As in previous years, Maritime Forces maintained a presence in Canada's Arctic. Sovereignty and surveillance flights, search and rescue flights, flights in support of other government agencies and training exercises continued.

Due to the very heavy commitment of forces to the support of the Olympic Games, it was not possible to deploy Maritime Command ships to the Arctic in the normal manner during 1976. This situation will not occur in 1977 and a full deployment is planned.

Personnel from Maritime Air Group participated in a joint Canadian Forces/Royal Navy exercise in the Arctic in October. Activity for a 10-day period was co-ordinated by research and development communities of both forces and involved flights by an Argus aircraft and an under-ice transit to the North Pole by HMS Sovereign, a nuclear-powered submarine.

The purposes of the exercise was to establish the relationship between the top and bottom profiles of the sea ice. The development of such relationship is considered of value:

in the prediction of safe depths for pipeline laying and submarine operations;
in studies of the contribution of form drag at the ice-water interface to ice dynamics;
in studies of the heat balance of the Arctic Ocean and the mean growth rate of ice; and

in the prediction of acoustic transmission loss under ice.

The acquisition of ice reconnaissance data is a continuing requirement met by the Department of Fisheries and Environment (Atmospheric Environment Service) with assistance from DND and other agencies.

Argus aircraft maintained a minimum schedule of three 40-hour patrols per month, operating from bases at Frobisher, Edmonton, Yellowknife, Goose Bay, and Thule, Greenland. Approximately 1 200 hours were flown by Argus operating in the Arctic. Although the primary purposes of Argus flights were sovereignty protection and surveillance, many were flown in support of other government agencies. During the ice-season most northern patrols carried MOT ice observers and conducted ice reconnaissance as a secondary task. Patrols were also assigned photographic

tasks on behalf of DIAND, DFE and EMR, such as the investigation of off-shore oil exploration and drilling activity on the archipelago, and reporting on population movement. Scientists and observers from other government departments were frequently carried, conducting such activities as investigation of seabird and marine populations in the Beaufort Sea, and ice research along Arctic shores.

Land Forces

As a result of the Olympics, land force training in the North was reduced in 1976. Churchill became the focal point on two occasions when company-size elements deployed by air conducted exercises in the surrounding area. Two serials of the Arctic Warfare Instructors Course also took place at Churchill. Long-range communications exercises were conducted from Yellowknife, Cambridge Bay, Hall Beach, Gladman Point and Coral Harbour.

Mobile Command has designed and proven the practicability of a new exercise nicknamed "Northern Viking". Troops are deployed using Air Command Resources and are placed under operational control of Commander Northern Region once they are on the ground in the Arctic. The purpose of the exercise is to allow platoon-size groups of approximately 25 (all ranks) to practice leadership at the lower levels of command while familiarizing themselves with living in the northern environment. An adjunct to training is the placing of cairns containing survival equipment at key locations in the exercise area and the rendering of assistance to the native people. The trial exercises were conducted in the Fort Rae, Pangnirtung and Fort Simpson areas with great success.

Airfield construction at Cape Dorset, Pond Inlet and Eskimo Point continued in 1976. In addition, equipment and portable accommodation was moved to Spence Bay where construction of an airfield is planned for 1977. Responsibility for technical, logistical and administrative support to this program was provided by No. 1 Construction Engineering Unit Winnipeg. Air Command provided heavy airlift and weekly resupply support.

During 1976, Inuit labour was employed to the maximum extent with only military personnel on the sites as supervisors. The Cape Dorset airfield was completed and turned over to Transport Canada in October 1976.

Bridge construction over the Eagle River at Mile 237 of the Dempster Highway, YT was

started in September 1976 with the abutments constructed by December 1976.

The program to rehabilitate CFS Alert, Operation TRELAR, continued in 1976 with the construction of a 71-man barrack block and two tuning huts. The interior of the transmitter building was finished and new antennae bases installed. An Auxiliary Power Unit for airfield lighting and an illuminated wind sock were also installed. On-site supervision was provided by No. 1 Construction Engineering Unit. Military tradesmen were provided from various CF bases and militia units across Canada.

The Canadian Forces Mapping and Charting Establishment carried out field survey operation "Arctic 76" on Southern Baffin Island, NWT, from June to August 1976. Horizontal and vertical control points were established to proved data for 200 new maps of 1:50 000 scale covering approximately 140 000 sq km (55 500 sq.mi.). A second order Geodetic Control framework in the survey area was established. The survey team was supported by two Gazelle helicopters from Great Lakes Helicopters (civilian) and airlift and resupply flights by Air Transport Group of Air Command.

Air Forces

During annual BOX TOP airlifts, Hercules aircraft transported approximately 1 219.25 t of general cargo such as vehicles, building materials and rations to Canadian Forces Station Alert. In addition, approximately 20 700 700 of gasoline and fuel oil were airlifted from Thule, Greenland to Alert.

Hercules aircraft continued to provide weekly scheduled services and special flights as required to Canadian Forces Communications Stations at Alert and Inuvik and to northern region headquarters at Yellowknife.

Buffalo and Hercules aircraft flew 670 hours in support of northern airfield construction programs at Cape Dorset, Eskimo Point and Pond Inlet. The LAPES method of cargo delivery was again used to a considerable extent in this operation. This method of delivery involves the Hercules aircraft flying across the selected drop zone at a wheel height of 1.5 m and extracting the load from the aircraft by parachute. Loads up to 16 344 kg can be delivered using this technique.

Two Twin Otter aircraft, located at 440 Squadron Detachment Yellowknife, were utilized for communications and, as required, search and rescue in support of primary search and rescue aircraft.

CF5 tactical fighter aircraft of 433e Escadrille tactique de combat Bagotville, PQ and 434 Tactical Fighter Squadron Cold Lake, Alta. flew a variety of tactical support and photographic reconnaissance sorties in the North. These flights, supported by 437 Transport Squadron CC137 Boeing air-to-air refueling aircraft, were flown from southern bases and accomplished tasks such as photographic coverage of 1 000 km of the Canadian section of the Alaska highway system and photo coverage of Eagle River located in northern Yukon. A reconnaissance mission was also completed to the Soviet manned ice island (NP-22) which is located 600 km from the North Pole.

The Canadian Forces Air Demonstration Team, the "Snowbirds" again opened their air display season with air shows in northern Canada at Fort Smith, Yellowknife, Norman Wells, and Inuvik, NWT, and Whitehorse and Watson Lake, YT.

Search and Rescue activities in the Arctic during 1976 were limited to a few minor operations. However, one of these, which involved the rescue of two pilots and two passengers from a Twin Otter crash, 160 km west of Repulse Bay, developed into a rescue operation which would be similar to the response made to a large commercial airliner downed in the North. The aircraft was declared overdue at 2135 hours on November 18, 1976 because of failure to arrive at Repulse Bay after the pilot reported to Coral Harbour Air Radio Station that he was 80 km south and estimating Repulse Bay at 1950 hours. The subsequent search, which involved two C130s and one Argus aircraft, resulted in the location of the site by one of the Hercules at 1557 hours on November 19. Initially, it was determined that the airlift owners would effect rescue using a ski equipped aircraft. However, the local terrain necessitated the use of helicopters and these were dispatched from Edmonton and Ottawa. Military rescue specialists were parachuted into the scene. After some delay due to weather, one of the military helicopters delivered the downed crew and the rescue specialists to Repulse Bay at 0454 hours on November 23, four days and nine hours after the crash. Four Hercules, one Argus and two Chinooks had flown a total of 103.6 hours at a cost of over \$200 000.

The DEW Line, consisting of four main sites and 17 auxiliary sites, continues to provide military presence in the Arctic. These military installations stretch from Cape Dyer on the east coast of Baffin Island to Komakuk Beach

near the Alaskan border. While all sites are operated by the United States Air Force, the airfields at Tuktoyaktuk, Hall Beach, and Cambridge Bay are operated by Transport Canada.

Air Reserve activities in the North in 1976 were somewhat limited by the support given by the CF to the Olympics. However, 402 Squadron conducted numerous flights to Churchill in support of Air Command and the Militia. Arctic training by 418 Squadron maintained a capability to conduct northern Search and Rescue operations. Additionally, the squadron provided some essential flying services to northern region headquarters.

Helicopters of No. 10 Tactical Air Group took part in a number of activities north of 60°. Two CH-147 Chinook helicopters cached 155 268 kg of fuel in 93 hours. The aircraft worked out of Frobisher and flew in support of the 1977 mapping program on Baffin Island and the DND Mapping and Charting Establishment. Two CH-135 helicopters were used on Ellesmere Island during both April and September, 1976 in connection with three DND operations.

Plans for 1977-78

Maritime Forces

It is intended to deploy one operational support ship and two destroyers to the Arctic in the summer of 1977 to support scientific research, resupply and settlement visits. In addition, normal surveillance and sovereignty patrols will be conducted.

Maritime air activity will continue at its present level consistent with the priorities of other tasks and responsibilities of Maritime Command with support to other government agencies when warranted.

Land Forces

Plans for 1977-78 include a requirement for each Combat Group to conduct two company-sized exercises north of 60°. No-notice exercises under the nick-name "Quick Viking" will also be conducted with personnel alerted and deployed from their normal bases. Units are airlifted into a specified northern airhead under the pretext of a calamity and the necessary trained personnel and Arctic equipment available.

In addition to the foregoing, the following land force activities will be conducted during 1977-78:

approximately 19 serials of the platoon-

sized Exercise Northern Viking will be deployed; the Eagle River Bridge will be completed; construction on the airfield at Eskimo Point and Pond Inlet will continue; construction will commence on the airfield at Spence Bay; Operation TRELLAR, the rehabilitation of CFS Alert, will continue; and the northern survey operation will continue.

Air Forces

Hercules aircraft will continue to provide regularly scheduled service to Alert, Inuvik and Yellowknife. Buffalo and Hercules aircraft will be used during the spring, summer and early fall to provide support for the northern airfield construction program and mapping and charting. The Twin Otters at Yellowknife will continue to provide essential service to northern region headquarters.

CF5 tactical fighters of No. 10 Tactical Air Group will fly operational support and photographic reconnaissance missions to several northern locations. Most missions will be flown from southern bases and supported by 437 Transport Squadron air-to-air refuelling aircraft.

The Snowbirds, the Canadian Forces Air Demonstration Team, will open their 1977 season with air shows in northern Canada at Hay River, Yellowknife, Norman Wells and Fort Simpson, NWT and Watson Lake and Whitehorse, YT.

Air reserve squadrons will be involved in a combined naval reserve/air reserve exercise in the Victoria Strait and Queen Maud Gulf area.

Helicopters will be used more extensively in the North during 1977 to provide increased support to the mapping and charting program as well as support for Mobile Command exercises and the Defence Research Establishment.

Chief of Research and Development

Responsibilities

The Chief of Research and Development (CRAD) is responsible for the overall conduct of the research and development activities of the Department of National Defence. He directs and controls six research establishments, their resources, and their programs. He formulates and recommends research and

development policies and provides the necessary guidance and co-ordination for implementation. He is also responsible for ensuring that knowledge of actual and anticipated advances in science and technology is available to support departmental decisions concerning the development, engineering, design, procurement, installation, maintenance and operation of all new equipment, supplies and systems; he provides an interface between defence research, development activities, and the Canadian Forces.

In the context of northern activities, CRAD is responsible for providing to the Canadian Forces scientific knowledge, experience and hardware options to solve problems associated with military operations in high latitudes. In discharging this responsibility CRAD sponsors and undertakes research and development projects aimed at acquiring relevant new knowledge and equipment.

Review of 1976-77

Research having implications for northern activities was conducted at four of the six Defence Research Laboratories across the country. These studies are functional and multi-disciplinary. Because the broad work categories outlined above overlaps in several laboratories, the text that follows has been organized without continuous reference and credit to the performing research establishment. The following list is therefore presented to give some idea of the number involved and the general field of interest of each:

Defence Research Establishment Pacific (DREP) – is primarily engaged in research devoted to improving methods for submarine detection in the Pacific and Arctic Oceans. Effort is mainly directed towards underwater acoustics, electromagnetics, and fluid dynamics. Also DREP is investigating ice-covered water to predict sea-ice effect on surface and sub-surface mobility;

Defence Research Establishment Suffield (DRES) – conducts research on problems concerned with protection against biological and chemical warfare. The programs are complementary to and co-ordinated closely with those of DREO. Other programs include range clearance technology, field applications of explosives, and effects of explosives;

Defence Research Establishment Ottawa (DREO) – carries out scientific activities on protection against nuclear, chemical and biological hazards as well as investigations on

threats from the natural environment. Other programs include research and development on vehicle mobility, electrical power sources, aspects of defence electronics, and remote sensing. DREO co-ordinates military communications and radar projects at the Communications Research Centre; and

Defence and Civil Institute of Environmental Medicine (DCIEM) — is concerned with effective performance of the military man, including research and development programs on human responses to stresses such as high altitude and acceleration, physical fitness, aerospace life support systems, infection and immunity, and deep diving. Tasks include behavioural and bioscience investigations relating to sea, land and air operations.

Research in the North has also been supported to a small degree by means of contracts to universities and Canadian industry. Facilities, goods and services were provided to other government agencies and close collaboration was maintained with research and development agencies in other countries.

Research Directed to Protecting the Soldier and his Equipment

Scientists and seconded military personnel accompanied military exercises in the Canadian North to familiarize themselves with clothing and equipment problems under realistic use conditions; and to evaluate promising new protective items under severe winter conditions.

Two series of tests were conducted in January 1977 at the Eastern Arctic Scientific Resource Centre (EASRC) which is operated by the Department of Indian Affairs and Northern Development at Igloolik, NWT. In the first series, the body's general sympathetic system's response to a local cold stress was investigated using Inuit subjects. The data obtained complemented measurements made on other subjects at DCIEM, in Downsview. In the second series of tests, the rate of body cooling was measured in the case of subjects exposed to a variety of weather conditions while wearing military arctic clothing. The personnel of EASRC participated extensively in data collection in these stress studies.

Exercise Passage North, held in February 1977 at CFS Churchill, provided the opportunity to evaluate a wide variety of experimental and developmental equipment and clothing items. Heat distribution, moisture and toxic gas measurements in tents under consideration for future adoption by the Canadian

Forces showed the effects of tent shape and use of liners on the heating requirements for basic personnel shelters. Charcoal-fuelled radio battery heaters, designed to prolong the operating life of communications equipment batteries under extreme cold conditions, were also tested.

During Exercise Passage North, the force required to pull loaded toboggans over various types of snow-covered terrain was measured. The use of a Lexan film on the sides of a toboggan was found to reduce substantially the amount of pulling force required as compared with the standard toboggan. An improved version of a head protector, designed to protect the face under extreme wind-chill conditions, was found to satisfy all requirements. An experimental clothing system consisting, in part, of zippered leggings and a lightweight windproof parka, was successful in preventing overheating during strenuous activity while still providing sufficient thermal insulation during periods of inactivity. Reports on the evaluations carried out during Exercise Passage North are now in preparation.

A heated medical pannier, developed by the Norwegian Defence Research Establishment, was tested by field ambulance crews during a winter exercise at CFB Petawawa. The heated medical kit maintained injectables in a fluid state under very severe cold conditions. These injectables became frozen under the same conditions when stored in the standard pannier.

For protection against biting flies, new repellent mixtures, tested on wide-mesh over-jackets, were found to give a high level of protection. During the summer months, the over-jackets treated with a synthetic pyrethroid compound will be tested with a view to assessing their potential for control of mosquitoes and blackflies.

Effects of the Environment on Operations in the North

Work done under this heading is concerned with the effects of the environment on systems and machines used by the Canadian Forces as well as with the fundamental environment parameters themselves.

Environmental Studies

In the spring of 1976 a six-week program of oceanographic measurements was undertaken in Fury and Hecla Straits. Data were collected on water mass, tides and currents, by a party from the Igloolik Laboratory. Ice

conditions were also recorded and are being analysed, along with ice drift and current studies conducted earlier in Robeson Channel. In the late summer, acoustic measurements were made in Jones Sound and Barrow Strait.

Studies of the properties of snow as related to vehicle mobility and a study of the low-temperature operation of vehicles are in progress.

Remote Sensing

A Joint UK/Canadian experiment was carried out in the Arctic Ocean in October. The main goal of the exercise was to make a statistical comparison between the bottom and top profiles of Arctic sea ice.

An optical correlator has been completed and tested in the optical bench configuration. The primary purpose of this instrument is to convert to interferograms produced by synthetic aperture radars into high resolution imagery. The correlator has been applied to interferograms of sea ice collected by the DND/CRC synthetic aperture radar in the Arctic Ocean. A modified version of this correlator may be used to process synthetic aperture radar data collected by Seasat over the Eastern Arctic and coastal regions.

Military Engineering

A second series of trials was carried out near Inuvik to test the suitability of commercial explosives for evacuation in permafrost. The performance of both a commercial pelleted TNT explosive and an experimental pelleted RDX/TNT explosive developed at DREV appeared to be excellent in a number of one hundred pound shots conducted in a bed of permanently frozen silty clay typical of the fill found in the Inuvik region. It is hoped that investigations will continue during the winter of 1977-78.

An assessment is currently being made for the Canadian Forces, of various power sources potentially suitable for the propulsion of under-ice vessels for search and rescue or for command and control in the Arctic. The feasibility of using nuclear power sources, thermal engines, fuel cells and high-energy density batteries in submarines and submersibles to provide the desired submerged capabilities has been examined.

As part of a study directed towards providing lead-acid batteries of improved low-temperature capability, the cranking characteristics of many modern commercially available lead-acid batteries were examined at temperatures down to -40°C, and research directed

at improving the charge acceptance has been pursued. The latter has led to the discovery of an electrolyte additive which improved the low-temperature performance of a single positive electrode of the lead-acid couple in test cells, and the effect of this additive, which is presently the subject of patent discussions, on the low-temperature performance of commercial batteries is now being studied.

A feasibility study was made of reliable, self-contained, 30W power source systems for Arctic data-transmission repeater stations. The power source system must be transportable by a helicopter and capable of unattended operation for one year. Economic and technical considerations reveal initial-installation advantages in using air depolarized batteries instead of fuel cells, wind turbine, propane-fuelled thermoelectric power sources or other batteries. Comparative performance information on several systems is being assembled.

A system to examine the feasibility of coupling a wind-turbine with battery electrical energy storage to provide low continuous power for unattended operations has been installed and the performance and reliability of the system is being evaluated. Computer modelling, using the data obtained, is being done to assess the feasibility of using such a system in the North.

Studies have continued on various aspects of the low-temperature performance of primary batteries. A zinc electrode capable of much improved low temperature performance in zinc/air batteries has been prepared and proven on a laboratory scale, and is being offered to industry.

A feasibility study to determine the cost-effectiveness of using nickel-cadmium batteries widely in tactical military land vehicles in cold environments was initiated. Pertinent comparative information on lead-acid and nickel-cadmium batteries is being compiled, as well as information on the operational procedure for SMP vehicles.

Communications

The investigation on the feasibility of using the Anik satellite in communicating with the high Arctic is continuing at Eureka.

Protection of the Environment from Military Operations

Testing of the non-aggressive grouser for tracked vehicles shows considerable promise in minimizing ground damage by vehicle tracks. Studies are continuing to find a lighter

substitute for the polyurethane used in its construction.

Trials of new pesticides and of improved spraying techniques were continued. Use of new, low-volume applicator was recommended for Canadian Forces Bases. A growth control compound, Altasid SR-10, has been given federal registration for mosquito larvae control and is showing promise for the control of blackfly larvae as well.

Plans for 1977-78

The research program carried out under the Chief, Research and Development is a continuing one and much of the work will be pursued in 1977-78. However, emphasis does change as research conclusions are adopted and new problems tackled.

Research Contracts 1976-77

With McGill University for:

Research on Wheel and Track Systems for Off-road Vehicles; and
Evaluation of Terrain for Mobility

With the University of Guelph for:

Evaluation of Reldan for Biting Fly Control;
and
Improved Terrain Trafficability Mapping System.

With the University of British Columbia for:

Analysis of Terrain in North East British Columbia.

With Memorial University for:

Revision of the Canadian Forces Pest Control Manual.

With the University of Alberta for:

Research on Explosive Cratering in Permafrost.

With Innovative Ventures Ltd for:

Study of Unconventional Drive Systems;
and
Suspensions and Modular Construction for a Light Off-Road Vehicle.

With Cominco for:

Low Temperature Lead-Acid Batteries.

With MacDonald, Detwiler and Associates for:

Research into the Development of Low Power Data Acquisition, Processing and Storage System for Long-Term Emplacement in Remote Sites.

Extramural Grants for 1976-77

With the Royal Military College for:

Thermal Effects in Permafrost;
Geared Variator Analysis; and
Evaluation and Stabilization of Highly Compressible Terrain for use as V/STOL.

Department of National Health & Welfare (NH&W)

Health

Medical Services Branch

Responsibilities

Through its northern health activities, the Medical Services Branch of the Department of National Health and Welfare is responsible for developing total health care in the North. The Branch plays a dual role in providing health services to all northern residents, exercising not only its federal responsibilities but also acting in the capacity of a provincial health department in both territories. The territorial councils, however, enact territorial health ordinances. The governments of the Yukon and Northwest Territories have responsibility for the operation of health insurance plans and for the establishment, maintenance and management of hospitals, except federal hospitals and health facilities.

Plans for further increasing territorial responsibilities are in the process of development subject to the involved levels of government being able to work out arrangements acceptable to territorial residents.

Yukon Region

Review of 1976-77

1976-77 was a year in which the Yukon Region of Medical Services Branch consolidated its organization for the delivery of health services in the Yukon. The only direct health services with major participants from outside the territory were the chronic disease and tuberculosis control programs — which were directed from the Northwest Territories regional office in Edmonton.

In April, 1976, new arrangements were made to have five hospitals in the Yukon Region operate under budget review status with the financial responsibility on the Yukon Territorial Government for insured care provided. This was a significant preliminary step to the transfer of health services to the Yukon Territorial Government.

Five nurses from the Yukon attended Clinical Training Courses. These courses involve four months of theoretical and practical training designed to increase the diagnostic and clinical skills of nurses to prepare them for employment in isolated communities. One nurse participated in the Nursing Administrative Course. Three nurses attended a winter survival course.

During the year a dental therapist operated full-time in Dawson. This was a first step toward

decentralizing dental therapists to communities in the Yukon outside of Whitehorse. The School Dental Health Program continues to benefit from the support and supervision provided by members of the Yukon Dental Association.

In November, 1976, a public health nurse was employed on a permanent basis in Pelly Crossing.

During the month of December, 1976, 1200 Yukoners were immunized with swine flu vaccine. Shortly thereafter the program for immunization with monovalent vaccine was discontinued in accordance with the change in policy on a Canada-wide basis.

The Yukon Region participated with other departments on a technical committee whose first task is to assess the extent of mercury contamination in Yukon waterways. The Yukon Region is contributing resources for a survey on this subject commencing in the spring of 1977.

The incidence of venereal disease in the Yukon continues to cause concern. A second registered nurse was recruited to work full-time on the region's Infectious Disease Control Program.

Financial support was provided for three projects under the National Native Alcohol Abuse Program, — jointly funded by the Department of Indian Affairs and Northern Development (DIAND).

Watson Lake — The new Watson Lake Hospital started admitting patients in April, 1976. In addition to the 10 beds for in-patients and an out-patient department, the hospital includes public health and dental facilities, office space for a doctor in private practice and a staff residence.

Whitehorse — Major renovations to the maternity ward and the delivery suite and air-conditioning of the laundry room began at the Whitehorse General Hospital with completion scheduled for late summer 1977. Renovations began in March, 1977, on rented facilities in downtown Whitehorse to accommodate the public health and dental health clinics with occupation planned for June, 1977.

Plans for 1977-78

Plans have been prepared for the installation of a new incinerator and the initiation of the first phase of a project for renewal of parts of the steam distribution system in the Whitehorse General Hospital. Renovations and an addition to the Faro Nursing Station are also planned.

Review of 1976-77

Northwest Territories Region

The Northwest Territories Region assisted Alberta Region in the operation of X-ray clinics for T.B. control and in the provision of a computerized recall for tuberculosis followup.

Direct physician services were provided by the Northwest Territories Region in all centres except Yellowknife, Hay River and the Keewatin District. Private practitioners service Yellowknife and Hay River; and the University of Manitoba through its Northern Health Unit provides general practitioner coverage within the Keewatin. A single private practitioner supplements departmental practitioners in Inuvik and a part-time physician provides ophthalmological services in Fort Smith.

Ophthalmological services are provided chiefly by contract through universities or from the Stanton Yellowknife Hospital. Other special services are provided by contract with the medical faculties of the University of Alberta, University of Manitoba, University of Toronto and McGill University. General Hospitals operate at Inuvik with 55 beds and at Frobisher with 35 beds. There are cottage hospitals at Fort Simpson and Rae/Edzo, and nursing stations in settlements throughout the territories. Some 20 staff physicians provide visiting services to settlements in the Northwest Territories.

Dental Care is provided by staff dentists resident in Inuvik, Frobisher and Churchill and by private contract in the Mackenzie Zone assisted by graduates of the Fort Smith School of Dental Therapy. During the academic year 1976, 33 students were enrolled of which 22 were in first year and 11 in second year. During the year, nine withdrew and of the 24 students who continued, two were sponsored by the Government of the Northwest Territories, five by the Government of the Yukon and five by DIAND. Three from the Northwest Territories, and nine from the south were not sponsored. To date, there are 10 dental therapists in the Northwest Territories and five in the Yukon. Orthodontic Services continued to be available in the City of Yellowknife by contract with an Edmonton based orthodontist.

The Community Health Representative program has been maintained and a second training course was held in Pangnirtung and Yellowknife with a total of 24 participants, 10 from the Baffin and Keewatin Zones and 14 from the Inuvik and Mackenzie Zones.

The Fort Smith school for the training of



The new Watson Lake Hospital opened in April, 1976

Certified Nursing Assistants continued to provide graduates who are employed in hospitals within the NWT.

Twelve nurses from NWT settlements attended a Clinical Training of Nurses Program operated by the Universities of Alberta, Manitoba and Western Ontario. As a result of this program 30 per cent of nursing stations have a nurse trained under this program. In addition two nurses graduated from the Dalhousie University Outpost Nursing Program, three graduated from the Bachelor of Science Nursing Program and one nurse obtained a certificate in Public Health Nursing.

A consultant on alcoholism was added to the regional staff in 1976 to assist in the development of a native alcohol abuse program, working in close co-operation with the Government of the Northwest Territories whose Alcohol Co-ordinating Council acts as a regional advisory board to the Native Alcohol Abuse Program.

Baffin Zone

Pond Inlet — A new nursing station was completed and opened. The building was erected

in about four months and has a complement of three nurses with diagnostic, treatment, dental and public health services as well as five adult and three paediatric beds. Mechanical services included an emergency power plant.

Clyde River — An emergency power plant was supplied.

Grise Fiord — A self-contained emergency power plant is on site awaiting hookup once weather permits.

Frobisher — Re-roofing was completed on the hospital. Lack of materials prevented completion the previous year. Two new staff houses have been prefabricated and will be located on site by September 1977.

Cape Dorset — A site has been readied for construction of a new station in the forthcoming year. Plans and specifications have been completed.

Inuvik Zone

Inuvik — Problems encountered following takeover of the hospital expansion are being rectified by the contractor.

Norman Wells — A site has been acquired

and readied for construction of a new nursing station in the forthcoming year.

Fort McPherson — Leaking metal decking on the roof of this station has been replaced by a low slope shingled roof.

Keewatin Zone

Rankin Inlet — An emergency generator was placed in operation.

Repulse Bay — A metal storage shed and an emergency power generator were installed. Whale Cove — An emergency generator was placed in operation.

Baker Lake — An emergency generator was provided.

Belcher Islands — An emergency generator was on site awaiting hookup when weather permits.

Chesterfield Inlet — A prefabricated station complete with diagnostic and treatment facilities was set up in this community. It has three beds and a full range of mechanical services including an emergency power plant. Provision of a sewage pump-out truck by the community will allow the station to become



Patient room in the new hospital at Watson Lake

fully functional. The nursing complement will be two registered nurses.

Eskimo Point — Plans are complete for a new addition and renovations to the nursing station.

Mackenzie Zone

Lac la Martre — A prefabricated building was installed. It provides space for teaching, diagnostic and treatment services as well as accommodation for a nurse.

Fort Rae — A prefabricated clinic building was set up.

Edzo — Plans were prepared for a 10 bed nurses residence; construction to take place in 1977.

Gjoa Haven — An emergency generator was installed.

Plans for 1977-78

Baffin Zone

Frobisher — Plans were completed for a new addition to the Frobisher Hospital to provide space for active treatment, dental services and offices. Construction should be well under way in 1977 and completed in 1978. Two residences were purchased in 1976 and will be located in 1977 on property adjacent to the hospital for staff.

Cape Dorset — Plans, specifications and site were completed for a new nursing station. Tendering will be delayed until the Frobisher Hospital is completed.

Hall Beach — New siding, windows and provision for stretcher access will be provided for the Hall Beach Nursing Station. Some in-

terior work will be done to add several years to the life of this station.

Arctic Bay — Lake Harbour — Plans calls for Emergency Power Generators to be installed.

Inuvik Zone

Norman Wells — A site for a new nursing station has been acquired and construction is planned for 1977 to replace the Imperial Oil buildings now occupied by the nursing station.

Tuktoyaktuk — A residence for a dental therapist will be provided and the site prepared. Emergency power plants are to be replaced in the Aklavik and Fort Franklin nursing stations with automatic diesel units.

Mackenzie Zone

Edzo — A 10 bed-sitting room residence is to be built in 1977 to provide accommodation for the hospital staff.

Coppermine — A standby boiler and other improvements to the heating system will be completed in 1977. An emergency power plant is to be provided at the nursing station.

Keewatin Zone

Eskimo Point — An addition and renovations to the nursing station are being undertaken in 1977. A new station is under consideration but site problems are being encountered.

Baker Lake — Modifications to improve the heating system and provide an additional boiler for back-up are planned for 1977. Fire alarm systems are being improved in several stations with installation of smoke detectors.

Health Programs Branch

Responsibilities

To ensure that all residents of Canada have access to effective health care services, at reasonable cost according to their needs, the Branch administers the Hospital Insurance and Diagnostic Services Act (1958) and the Medical Care Act (1968) which enable the federal government to make financial contributions to the provinces and territories under the Federal-Provincial Fiscal Arrangements and Established Programs Financing Act, 1977, in respect of the costs of the insured services of the national programs incurred by provincial and territorial hospital insurance plans and medical care insurance plans which meet certain specified criteria of the federal legislation. These criteria include:

- comprehensiveness of the insured services;
- universality of the coverage which must be provided under equal terms and conditions to all eligible residents;
- portability of the coverage when an insured person is temporarily absent or moving to another province or territory; and
- administration on a non-profit basis by a public authority.

The federal legislation gives each province and territory considerable leeway in determining the administrative arrangements for the operation of its plans, in deciding how its share of costs will be financed (e.g. through premiums, sales tax, other provincial revenues or by a combination of methods), in deciding whether coverage will be on a voluntary or compulsory basis and whether or not services additional to those of the national programs will be included in the provincial plans.

The federal government is also making an additional equal per capita cash contribution to the provinces and territories to compensate for extended health care programs under the established program financing arrangements. The specific extended health care services in respect of which this contribution is paid are nursing home intermediate care, adult residential care, converted mental hospitals, health aspects of home care and ambulatory health care services.

The Branch is also responsible for the management of the Health Resources Fund, which was established in 1966 in the amount of \$500 million to be spent over the following 15 years to assist the provinces in meeting the national needs for new and improved facilities for the education of health manpower and for health research. Another major responsibility is the administration of an extensive program of health care. The Branch also has a major health economic and statistics division which provides economic and social research support for health policy planning and development. Consultant services are also provided by the Branch to the provinces and territories when required both in connection with the operation of their health insurance plans and also to assist them in planning and implementing changes in their health care delivery system.

Review of 1976-77

The federal and provincial governments reached an agreement in December 1976 whereby the shared-cost arrangements for financing the insured services of the national

health insurance programs and the post-secondary education program would no longer be tied to provincial expenditures on these programs from April 1, 1977. Federal contributions for these established programs would take the form of the transfer of tax room and associated equalization in conjunction with per capita cash transfers, with the latter being escalated thereafter in accordance with changes in the G.N.P. The per capita contributions would gradually be adjusted until all provinces and territories will be receiving contributions based on the national average at the end of five years. The Health Economics and Statistics Division is maintaining a medical care data bank to provide uniform data relating to the operations of the medical care program to enable federal, provincial and territorial governments to carry out program evaluation and program planning. Special emphasis was given to the development of guidelines and standards in a number of areas.

Plans for 1977-78

The provision of financial support to the provinces and territories, consultant services, advisory and research support will be continued.

Health Protection Branch

Through the Health Protection Branch, the department provides an integrated program to protect the public against foods, drugs, cosmetics, medical and radiation emitting devices, against harmful microbial agents, technical and social environments deleterious to health, against environmental pollutants and contaminants of all kinds, and against fraudulent drugs and devices. It is responsible for enforcing the Food and Drugs Act and Regulations, the Narcotic Control Act and Regulations, and the Radiation Emitting Devices Act and Regulations.

A Non-Medical Use of Drugs Directorate has objectives which include prevention, treatment, rehabilitation and education.

An environmental Health Directorate carries out studies on the adverse effects on human health of the chemical and physical environment. The directorate jointly administers the Hazardous Products Act with the Department of Consumer and Corporate Affairs.

A Laboratory Center for Disease Control Directorate is involved in the development of improved laboratory diagnostic procedures and other measures to combat communicable disease agents. Epidemiological research is

carried out on both communicable and non-communicable diseases.

Welfare

Income Maintenance Branch

Family Allowances

Family Allowances are paid in respect of children under 18 years of age, living in Canada and maintained by parents or guardians. At least one of the parents must be a Canadian citizen, a landed immigrant or a non-immigrant who has been admitted to Canada for a period of not less than one year and whose income during that period has been subject to Canadian income tax.

The monthly allowance paid in 1976 was \$23.89 per child. The legislation provides for annual escalation of allowances in January on the basis of the cost of living. This escalation was suspended for 1976 but reinstated in 1977 when payment was escalated at a rate of 8.2 per cent. A province may vary allowances paid in that province in accordance with the age of the child or the size of the family, or both, provided the monthly allowance for each child is not less than 60 per cent of the federal norm and the amount paid for all children in that province averages the amount of the federal norm.

As of December 31, 1976, Family Allowances were paid in respect of 7692 children in the Yukon, representing 3675 families, and 19 679 children in the Northwest Territories, representing 7717 families.

Old Age Security

The Old Age Security provides for payment of a basic pension to everyone who has reached age 65 and who has fulfilled the residence requirements. The Act also provides for a Guaranteed Income Supplement and a Spouse's Allowance. The Guaranteed Income Supplement may be added to the basic pension for pensioners who have no other income or only a limited amount. The supplement is paid for a fiscal year, normally on the basis of a pensioner's income in the preceding calendar year. Income for supplement purposes is computed in accordance with the Income Tax Act. The maximum monthly supplement is reduced by one dollar for every full two dollars of monthly income over and above the basic pension.

The Spouse's Allowance was introduced in October, 1975. It provides a monthly allowance to the spouse of an Old Age Security pensioner if the spouse is between 60 and 65 years of age and meets the Old Age Security residence requirements. Entitlement is based on the combined income of the couple. The maximum monthly Spouse's Allowance is made up of an amount equivalent to the maximum Guaranteed Income Supplement at the married rate.

Old Age Security benefits are increased quarterly — in January, April, July and October — if there has been an increase in the cost of living. In January, 1977 the basic Old Age Security pension increased to \$141.34. The maximum monthly supplement increased to \$99.13 for a single pensioner or a married pensioner whose spouse was not receiving the pension or a Spouse's Allowance and to \$88.03 each for a married couple who were both pensioners. The maximum Spouse's Allowance was \$229.37 (\$141.34 Old Age Security equivalent and \$88.03 Guaranteed Income Supplement equivalent).

In December 1976, in the Yukon, there were 584 old age security pensioners, of whom 330 or 56.51 per cent were also receiving a supplement. In the Northwest Territories, there were 1089 old age security pensioners, of whom 839 or 77.04 per cent were also receiving a supplement.

Income Security Programs Branch

Canada Pension Plan

The Canada Pension Plan (CPP), in existence since January 1, 1966, is a compulsory, contributory, earnings-related social insurance plan which, together with the Quebec Pension Plan, covers virtually all employed persons between the ages of 18 and 70. Employees and their employers contribute 1.8 per cent of earnings between the Year's Basic Exemption and the Year's Maximum Pensionable Earnings, (\$900 and \$9300 respectively in 1977). Self-employed persons contribute 3.6 per cent. In general, the contributory period spans from 1966 or age 18, whichever is later, to age 65.

A retirement pension is payable to a contributor upon application, at age 65, whether or not that person has ceased working. The pension amounts to approximately 25 per cent of the contributor's insured earnings, averaged over his or her contributory period.

The maximum retirement pension coming into pay in 1977 is \$173.61 per month.

Disability pensions are payable to contributors suffering from severe and prolonged mental or physical disability. This benefit commences three months after the month in which the person is determined to have become disabled, and consists of a fixed monthly amount (\$44.84 in 1977) plus 75 per cent of the contributor's imputed retirement pension. The maximum monthly disability pension coming into pay in 1977 is \$175.05.

Surviving spouses' pensions are payable to the widow or widower of a contributor. The surviving spouse must be age 45 or older, or disabled, or have dependent children. A reduced pension is payable to a spouse between the ages of 35 and 45. The survivor's pension for a spouse under age 65 includes a flat-rate component (\$44.84 in 1977) plus 37.5 per cent of the contributor's retirement pension. At age 65, the pension changes to 60 per cent of the deceased contributor's retirement pension. The maximum survivors' pension coming into pay in 1977 is \$104.17 for surviving spouses under and over age 65, respectively.

Children's benefits are payable on behalf of unmarried dependent children of deceased or disabled contributors. The child must be under age 18 (age 25, if in full-time attendance at a school or university). In 1977, the rate is \$44.84 for each of the first four children plus \$22.42 for each additional child divided equally amongst the children.

A lump-sum death benefit, equal to six times a contributor's monthly retirement pension, to a maximum of 10 per cent of the Year's Maximum Pensionable Earnings (\$930 in 1977), is paid to the estate of a deceased contributor.

Eligibility for benefits other than the retirement pension is subject to the contributor having made contributions to the plan for specified minimum periods.

Benefits in pay are adjusted annually to fully reflect increases in the cost of living.

Social Service Programs Branch

The Canada Assistance Plan

The Canada Assistance Plan was enacted in 1966 to support integration, broadening and improvement of the public assistance programs of the provinces and territories and their municipalities, and to encourage the extension and development of welfare services. Under the plan, contributions amounting the

50 per cent of shareable costs are made toward provincial, territorial and municipal expenditures for public assistance and welfare services.

The Canada Assistance Plan has two primary objectives: to help provide adequate assistance to persons in need, and to encourage the development and extension of welfare services intended to prevent and remove the causes of poverty, of child neglect and dependence on public assistance. All provinces and territories have signed agreements under Part I (General Assistance and Welfare Services).

In addition to the cost sharing arrangements, the Canada Assistance Plan makes available to the provinces and territories, at their request, consultant services in areas such as income support, day care, child welfare institutional care, community development and work activity.

Vocational Rehabilitation of Disabled Persons Program

The Social Service Programs Branch also administers the Vocational Rehabilitation of Disabled Persons Program. The federal government through this program, shares the cost with the Yukon and Northwest Territories of providing vocational rehabilitation services to persons who, because of physical or mental disability, cannot work. Such services may include counselling, assessment, restoration, training and job placement. There is also provision for a maintenance allowance and travelling expenses on an individual needs basis while the disabled person is receiving these services.

During the year, the Branch also provided consultative services to the territories in the development of their rehabilitation programs, which included programs for the rehabilitation of alcoholics when such programs were vocationally oriented. The utilization of this program is expected to increase in the coming year.

During 1976-77, the federal government finalized many territorial requests for cost-sharing. Reimbursement was made to the Northwest Territories for claims submitted for costs incurred during the year. Additional claims are still anticipated. Claims from the Yukon Territory are expected to be processed for costs incurred in the previous year, 1975-76, as well as during 1976-77.

Fitness and Amateur Sport Branch

Arctic Winter Games

The Arctic Winter Games is an international sports competition and cultural festival held every second year for northern people of Canada and Alaska. The Arctic Winter Games was held for the fourth time in 1976 and hosted by Schefferville, Quebec.

The Arctic Winter Games is intended to be common ground in developing northern athletes in Olympic Sports, in promoting cultural and social inter-change amongst northern people.

Northern Games

The Annual Northern Games were held in Coppermine, NWT in 1976 with Indians, Metis and Inuit representing communities of the Northwest Territories, Yukon and Alaska for friendly competition in traditional native sports as well as cultural and social activities.

There is no age limit for competitors, and a number of elderly native people have proven themselves to be vigorous participants in the many unique sport and cultural events.

The Northern Games are not a mere sports competition, but rather a festival in keeping with the traditional native gatherings of years ago.

Contributions were made to the Yukon Native Brotherhood and the Yukon Association of Non-Status Indians during 1976-77 through the Recreation Canada Directorate of the Fitness and Amateur Sport Branch. This contribution helped support activities which were not only developmental in nature but also interband, regional and provincial. The following are areas in which contribution funds were expended:

- inter-band sport and recreation events;
- leadership development clinics and seminars;
- skill teaching or training clinics;
- consultative and technical services;
- regional and provincial competition of a developmental nature, leading to integration into all Canadian competitive events.

Department of Public Works (DPW)

Responsibilities

The Department of Public Works, the principal construction arm of the federal government, undertakes a wide range of construction and maintenance work in the North, usually at the request of other government departments having responsibilities in the North. The department provides architectural, engineering and construction services, and assists in planning, site investigation, economic feasibility studies design, as well as as construction and management of buildings, public utilities, highways, harbours and wharves. It is also responsible for the acquisition and disposal of lands and properties, for the leasing of office and other space when Crown-owned space is not available, and for the upkeep of a great number of federal buildings in the North.

Public Works has a continuing responsibility for the development and maintenance of navigable waterways in the North. It is also responsible for the construction and upkeep of the northwest highway system, including the Alaska Highway and the Haines Road. The department provides an engineering service to the Department of Indian and Northern Affairs for the location, design and construction of roads under the northern roads program, which includes two major links in the North — the Dempster and Mackenzie highways.

Accommodation, construction, marine and highway operations in the North are the responsibility of the department's regional directors in the Pacific and Western regions.

Western Region — NWT

Review of 1976-77

Accommodation Operations

Federal housing completed includes one 19-suite, one-bedroom apartment building at Inuvik and a similar apartment complex at Norman Wells;

A 297 m² furniture facility warehouse was constructed at Inuvik;

Sixteen, three-bedroom detached houses are under construction at Norman Wells;

Sixteen, four-bedroom detached houses were completed. An apartment building consisting of six, two-bedrooms and 30, one-bedroom suites are under construction at Yellowknife;

A utilidor in the old Transport Canada subdivision at Norman Wells was constructed by

the Government of the NWT and funded by DPW;

RCMP detachments are under construction at Ft. Simpson, Hay River and Fort Good Hope.

Highways

Mackenzie Highway — Various contract packages were developed, but shelved for the section of the Mackenzie Highway from Wrigley at Mile 435 to the junction of the Dempster Highway at Mile 931. Future construction was deferred by DIAND;

From Mile 347 to Mile 394 a contract valued at \$8.7 million was completed in July of 1976;

From Mile 304 to Mile 308 a \$395 000 contract was awarded for grading and bridge relocation with completion expected in June 1977;

From Mile 314 to Mile 343, a contract in the amount of \$4 395 000 was awarded for grading with completion expected in August 1977;

Dempster Highway — During the past year major culverts at Rengleng River were installed at a cost of \$954 820;

The application of crushed gravel was completed from Mile 400 to Mile 337 for the amount of \$2 032 000;

Work continued on the construction of the grading between Mile 344 and Mile 290. This portion should be completed by August 1977;

Liard Highway — Design activities continued through 1976-77 towards the completion of final design;

Inuvik-Tuktoyaktuk Road — Geotechnical investigations, survey and design work continued throughout the past year towards the completion of the road design.

Among major programs carried out by Western Region's Marine Section was the relocation of the wharf and access road at Fort Norman and a vertical control survey on the Mackenzie River.

Operating and maintenance expenditures were in excess of \$40 000 for the launching, haulout and maintenance of floating wharves at Ft. Simpson, Ft. Norman, Ft. Good Hope and Aklavik, and for minor repairs to wharves at Ft. Resolution, Hay River, Norman Wells, Cambridge Bay, and Ft. Providence.

On behalf of the Government of the NWT, a shore erosion study was carried out at a cost of \$43 000 and emergency shore protection work was completed at a cost of \$133 000, at Tuktoyaktuk.

Dredging operations as part of a continuing program was carried out on the Mackenzie and Hay Rivers.

Pacific Region — YT

Highways

Review of 1976-1977

Routine maintenance of the Alaska Highway in the Yukon was carried out by the Government of the Yukon Territory, under agreement with Public Works Canada.

Routine maintenance of the Alaska Highway in British Columbia was carried out under three separate contracts, supervised and paid for by Public Works Canada.

Three gravel crushing and stockpiling contracts were successfully completed as part of the continuation of the cyclic resurfacing program. Applications of calcium chloride and oil to the surface were made at various locations minimizing dust hazards.

The following chart shows the construction program on the Alaska Highway during 1976.

Project	Location	% Complete
Construction	Mile 234-240	95
Construction	" 259-275	95
Construction	" 288-291	95
Construction	" 865-883	60
Construction	" 883-904	100
Paving	" 291-299	100
Paving	" 883-904	75
Sikanni		
Deck	" 162	100
Demolition		
Muskwa	" 297	80
New Deck		
Lower Liard	" 496	100
Eagle River (Dempster Highway)	" 235	75
Construction (Dempster)	" 178-236	100
Construction (Dempster)	" 236-254	60
Construction (Skagway)	" 66-85	60



Highway construction and maintenance is one of the many responsibilities of Public Works in the North

Buildings

Review of 1976-77

During 1976-77 Public Works Canada completed the construction of the RCMP headquarters in Whitehorse at a cost of \$2 000 000. The Yukon Territorial Building was completed by in-house staff for a cost in excess of \$10 000 000. The official opening took place in the spring of 1976.

A central operations complex for DIAND was completed and an addition to the build-

ing is now under construction. Some minor RCMP projects are in progress, along with several smaller jobs for National Health and Welfare. Tender documents were completed for the Beaver Creek Customs Facilities, but due to funding, no tender call was released.

Plans for 1977-78

The program for 1977-78 includes: construction and alteration of some minor RCMP projects; continued additions and alterations to existing facilities of National Health & Welfare;

a Parks Canada development at Haines Junction; and completion of tender documents for an administration building estimated at approximately \$1 200 000.

Maintenance of the Alaska Highway and Haines Road will continue.

Paving of the Alaska Highway between Mile 883 and 904 will be completed along with the construction from Miles 234-240, 259-275, 288-291 and 865-883. Construction from 240 to 259 will be completed. Construction will start on the project from Mile 928-940.

The Adsett Creek Bridge and the Teeter Creek Bridge on the Alaska Highway will be replaced.

Construction on the Dempster Highway from 236-254 and the Eagle River Bridge will be completed.

Construction on the Skagway will likely be completed from Mile 66-85.

Property Administration

Review of 1976-1977

The Property Administration Branch is continually involved in the on-going operation and maintenance of Crown owned and leased accommodation in the Yukon.

With the move by the RCMP and a large portion of territorial government offices to their new premises, alterations have been carried out to accommodate other government departments, thereby eliminating the need for leased space which they formerly occupied.

The Post Office addition at Fort Nelson has been completed and is now accommodating three federal government departments.

Northern Pool Housing in the Yukon continues to be administered by the Property Administration Branch. The annual work plan provides for cyclical repairs and preventative maintenance to maintain a good level of housing accommodation.

A committee has been established to formulate the procedures for the disposal of surplus housing at Whitehorse.

Plans for 1977-78

Renovations in the Casca Building for National Health & Welfare are underway. Most of the cost is for a laboratory in the premises, with in-service date expected by May 31, 1977.

The Property Administration Branch has no major projects listed in its 1977-78 annual work program. Emphasis will be placed on continued repairs and preventative maintenance, due to the necessity of energy conservation.

National Energy Board (NEB)

Responsibilities

Under the National Energy Board Act of 1959 and subsequent amendments the Board has two principal roles: to regulate specific areas of the oil, gas and electrical industries in the public interest, and to advise the government on the development and use of energy resources.

The Board acts as a regulatory body in issuing, with the approval of the Governor-in-Council, certificates of public convenience and necessity for the construction of interprovincial and international petroleum pipelines and international power lines as well as the issuing of licences for the export and the import of gas, and the export of oil and electrical power. The NEB requires the implementation of adequate standards of construction and operation to ensure the safety of any facility that it has certificated. The Board also has the authority to regulate the tolls charged by gas and oil pipeline companies under its jurisdiction to ensure that such tolls are just and reasonable.

In its advisory role, the NEB may on its own initiative hold inquiries into particular aspects of the energy situation and prepare reports for the information of the government, of Parliament and of the general public. The Board also carries out studies and prepares reports at the request of the minister.

The Board reviews and approves engineering drawings and specifications, environmental aspects and monitors the construction and testing of transportation systems before and during construction to ensure compliance to rules and regulations, safety standards and environmental guidelines before issuing a "leave-to-open" order.

The Petroleum Administration Act passed on June 19, 1975 empowers the federal government to impose a charge on the export of crude oil and certain petroleum products; to provide compensation for certain petroleum costs; and to regulate the price of Canadian crude oil and natural gas in interprovincial and export trade. The Board is required to administer certain aspects of that Act.

Review of 1976-77

Highlights of the NEB's activities during the last fiscal year include:

Joint hearing of Mackenzie Valley-Yukon natural gas pipeline projects commenced in April, 1976, with two major competing proposals to build a Mackenzie Valley pipeline. The hearing was expanded in October to include consideration of a third project which would move Alaskan North Slope

gas across the southern Yukon Territory, rather than down the Mackenzie Valley; preparation of information on exploration and development activities for oil and gas; preparation of estimates of reserves of oil and gas;

the Canadian Oil, Supply and Requirements hearing which began in October of 1976 and which will provide a new 20-year forecast of supply and demand; the filing of the Kitimat Pipeline Company Application, for a Certificate of Public Convenience and Necessity for a pipeline system from Kitimat, British Columbia, to Edmonton, Alberta, on December 8, 1976. The application proposes that Alaskan and offshore crude oil, arriving by tanker at Kitimat and pumped to Edmonton, would be transshipped through Interprovincial Pipeline facilities to the Northern Tier refiners in the United States; and continuing responsibilities in the areas of oil and gas pipeline extensions, monitoring of pipeline incidents, preparation of safety regulations.

National Film Board (NFB)

Responsibilities

The production of motion pictures, film loops, film strips, slide sets and still photo exhibits about the Canadian North, its peoples and their activities, its industries, resources, and institutions; the distribution of these materials in Canada and abroad; and the distribution in the North of such material interpreting Canada and exploring issues of national interest; counsel to federal government agencies concerning the application of audio-visual media and the planning, production and distribution of departmental films for information, instruction, training and cultural purposes.

Review of 1976-77

Staff

Two part-time employees operate the Challenge for Change program in Yellowknife. Film crews, trainers and distribution representatives travel to the North on assignment.

Film Production

The NFB co-produced three films with other government departments:

Schefferville, Fourth Arctic Winter Games, a half hour film co-produced with Arctic Winter Games Corporation covers the fourth Arctic Winter Games held in Schefferville, Québec, in March 1976, with emphasis on native sports.

A Great White Bird, a 52-minute film co-produced with the Canadian Wildlife Service of Environment Canada and the U.S. Wildlife Service. It is a story of the 40-year struggle to save North America's extraordinary bird, the whooping crane, which travels yearly from Texas to nest in Wood Buffalo National Park in the Northwest Territories.

Mother of Many Children, a one hour film co-produced with the Secretary of State and the Department of Indian and Northern Affairs illustrating the role of women in our native culture, their problems, contributions and achievements.

Aswagtiin (The Hunters) and *Oilaluganiatut (Whale Hunting)* are two films which were shot, directed and edited by Moshia Michael of Frobisher. They were filmed in super 8 mm and blown up to 16 mm by the NFB. Technical and artistic quality is outstanding. These were produced in collaboration with the Department of Indian and Northern Affairs and result from the work of the Arctic Animation Institute.

Assistance to Film Production in the North.

With the collaboration of the Department of Indian and Northern Affairs, the NFB, through its animation studio, supported the production of films in the North. In Frobisher, a non-profit incorporated society, *Nunatsiakmiut*, funded by the Secretary of State, the Department of Indian and Northern Affairs, the CBC and NFB, has produced 26 15-minute television programs in the local language. In addition, two half-hour specials on the new orthography and standardization of the Inuit language (Inuktitut) were produced in collaboration with the Inuit Cultural Institute. At Pond Inlet, a preliminary study on methods for community access to television was undertaken by the NFB and the Department of Indian and Northern Affairs at the request of the Pond Inlet Village Council.

Distribution

To improve film distribution services to the North, two additional centres were set up in addition to the Edmonton office which now serves the Mackenzie District. The Keewatin District will be served by Winnipeg, and the Baffin District by Ottawa. The NFB has also made arrangements with the Whitehorse Public Library for some NFB films to be made available in the Yukon.

Plans for 1977-78

At Pond Inlet, a NFB representative will attend study sessions on methods and techniques leading to village television service.

At Rupert House, Québec, teaching material on local Indian culture is printed and used in the area school. Plans are underway to film the project in 16 mm.

It is hoped that slides and film strips will be produced from material obtained during last year's filming of *Mother of Many Children* at Povungnituk.

A Great White Bird and *Mother of Many Children* will be dubbed in French with the financial support of Environment Canada and Indian and Northern Affairs.

National Museums of Canada (NMC)

National Museum of Natural Sciences (NMNS)

Vertebrate Zoology Division

Vertebrate Ethology Section

Responsibilities

The Zoology Division of the National Museum of Natural Sciences is a primary contributor to the knowledge of animal species in Canada. The museum conducts comprehensive faunal surveys and stores important collections of flora and fauna. Its scientific collections of arctic material are among the best in the world. This division co-operates with other government agencies and scientists of other countries interested in problems of the North.

The NMNS High Arctic Research Station was established on Bathurst Island, NWT, in 1968 in collaboration with the Polar Continental Shelf Project. The Vertebrate Ethology section is undertaking detailed, long-term studies at the station to investigate the relationships between species of arctic animals and the behavioural adaptations that enable them to survive in high arctic environments. This small field station permits some university students to undertake research and promote public interest in animal behaviour and conservation in the high arctic. A satellite research station at Seymour Island has been active since 1974.

Review of 1976-77

The research station operated from March 30 to October 4, 1976. The following projects were conducted:

Breeding Bird Census and Banding Program at Bathurst Island — Information on nesting, egg-laying, hatching, incubation and fledging was recorded at 133 nests of 20 species. The spring melt was later in 1975, and cool temperatures continued into July with snowfalls on July 2 and July 10. These conditions were reflected in the limited breeding attempts of Brant, Snow Geese, and Red Phalaropes. American Golden Plovers and Purple Sandpipers were recorded nesting for the first time on Bathurst Island. Thirty-four species of adult birds, and 142 young of 15 species were banded and colour marked. Sightings, recaptures and recoveries were made of seven species banded at the station in previous years.

Behaviour and Ecology of the Ivory Gull — The study of this rare and possibly endan-

gered species was continued on Seymour Island, the only known nesting site in the Canadian Arctic. Detailed information was collected on arrival in the nesting area, progression of reproductive cycle, colony site selection, breeding chronology, formation of subcolonies, anti-predator behaviour, development of the young, vocalizations, and effects of the weather. The established banding and colour marking program of adults and young was continued successfully. Two Ivory Gulls banded in 1966 at Cape Chidley, Labrador by East German biologists were intercepted at Seymour Island.

Breeding Behaviour and Phenology of Jaegers and Snowy Owls — The decrease in the lemming population adversely affected this project. Snowy Owls and Pomarine Jaegers did not breed. Parasitic Jaegers nested in usual numbers, but with limited success, and nesting attempts of Long-tailed Jaegers failed completely. The scarcity of lemmings shifted the predation pressure of jaegers to other species of birds, particularly to King Eiders and Snow buntings. Arctic foxes, in response

to the low supply of lemmings, concentrated heavily on nesting birds, including jaegers.

Behaviour and Ecology of Muskoxen — Ethological observations were continued on all aspects of muskoxen behaviour from basic maintenance functions to more complex social interactions. This year, emphasis was placed on the behaviour of sub-adult muskoxen, especially yearlings. Daily observations of herd numbers and movements throughout the study area of Polar Bear Pass were tabulated and plotted on aerial photographs. Age composition and sex ratios for each herd were recorded. The highest number of muskoxen seen on one day was 27 and the average daily count ranged from five in May, to 27 in April and August. Ten calves, eight yearlings and four other sub-adults were observed this year, indicating good progress towards recovery from the population decline of 1973-74. The continued collection of information on the muskoxen of central Bathurst Island since 1968 has allowed the documentation of dramatic changes within this population.



Daily observations were made of muskoxen herds at Polar Bear Pass, NWT

Reproductive Biology of Muskoxen — Field observations of courtship and rutting behaviour of muskoxen continued as in previous years and studies were initiated on anatomical and physiological aspects of muskox reproduction. Seven reproductive tracts obtained from Inuit hunters through the co-operation of the NWT Fish and Wildlife Service have been examined. Further studies involving histology and physiology are being carried

out in collaboration with the Department of Agriculture as specimens are received.

Behaviour of Wolves and Peary Caribou — Observations on these and other species of mammals were made whenever the animals were present in the study area. As in past years, several interactions between wolves and prey species were documented. Information on numbers, movements, activity and all aspects of behaviour of Peary caribou was

collected. Numbers of caribou were only slightly higher than in 1975 but included at least two calves and three yearlings.

Life History and Ecology of Varying Lemming

— Collection of data on population fluctuations in relation to weather conditions and burrow availability continued. Population estimates are based on trapping results. Specimens collected provide reproductive data used in determining breeding structure of the population which showed a precipitous decline compared with the 1975 observations. This decline resulted in no nesting attempts by three species of birds, and limited the breeding success of two other predatory species.

Plant Ecological Research in Polar Bear Pass

— This program is related to previous work in 1975 when vegetation communities, soils and environmental parameters were studied across a 2100 m ridge-lowland transect involving a total of 50 communities. The communities will be mapped using the spectral characteristics of infrared aerial photographs to provide a consistent interpretation of the area's vegetation patterns. These patterns will be related to habitat utilization of birds and mammals. Drafting of a map is in progress and should be completed in 1977. This project is also related to studies of plant stability and plant response to environmental stress in the vicinity of the research station.

Meteorology — Standard meteorological observations were made three times daily at Bathurst Island and twice daily at Seymour Island. Continuous records of sunshine, radiation, humidity, temperature and wind were maintained at both stations.

Archaeology — A brief archaeological survey of Polar Bear Pass was conducted by Museum of Man scientists. Fifteen sites were located including Arctic Small Tradition sites, Dorset Culture sites, and Thule — recent sites. Preliminary work consisted of surface collecting and site descriptions.

Plans for 1977-78

The High Arctic Research Station will continue the established programs to gain data on interspecific relationships, population fluctuations, and effects of weather and climate in relation to behaviour, social organization, population sizes and breeding success. The summer of 1977 will mark the 10th consecutive year of research at the Bathurst Island station. The satellite station at Seymour Island will be closed at the end of the current season.

A new project will be undertaken to study the behaviour and adaptation of seabirds utilizing polynias and islets as feeding and breeding habitats.

Studies of the social organization and breeding behaviour of Arctic Hare will be carried out on Axel Heiberg Island in late winter (March-April) 1977.

Investigation and evaluation of Dorset and Thule culture sites in Polar Bear Pass will be initiated by archaeologists from the National Museum of Man, following preliminary surveys in 1976.

Collection and study of fungi growing in Polar Bear Pass is proposed by the Biosystematics Research Institute, Department of Agriculture.

Botany Division

Phycology Section

Review of 1976-77

The last phase of field work in the Canadian Arctic related to the project *Survey of the Marine Algae in the Canadian Arctic* was conducted during July and August 1976. The field party consisted of the Curator of Algae, two scuba-diving assistants, and the pilot and engineer of a chartered helicopter.

Marine specimens, both plant and animal, were collected from 28 locations in Prince Albert Sound, Prince of Wales Strait, Barrow Strait, and more northerly bodies of water that included Nares Strait, Penny Strait, Nanson Sound, Sverdrup Channel and the Lincoln Sea. As a result of this and eight previous field seasons, sufficient specimens and data were gathered to complete a manuscript titled *A Catalogue of the Marine Algae of the Canadian Arctic* which has been submitted for publication to the Director of the National Museum of Natural Sciences.

Paleobiology Division

Quaternary Zoology

Responsibilities

To collect Pleistocene vertebrate material from the Yukon and to curate and describe it in an attempt to reconstruct the vertebrate history of the region during the ice age.

Review of 1976-77

From mid-July to mid-August a two-man field party collected Pleistocene vertebrate fossils from the Old Crow Basin in the northern Yukon. A National Museum of Natural Sciences

research base at Old Crow was completed and used for the first time by members of two scientific multidisciplinary groups working in the area (Yukon Refugium Project, Northern Yukon Research Program). A manuscript titled, *Pleistocene Mammals of the Yukon Territory*, reviewing the results of the Quaternary Zoology project from 1966 to 1975 was completed.

Plans for 1977-78

Plans for this period involve collection of Pleistocene vertebrate fossils in Old Crow and Dawson areas from July 1 — August 30.

Archaeological Survey of Canada

Responsibilities

To undertake research and rescue operations on the prehistory of Canada's native people.

Review of 1976-77 L13 + Arctic Islands

Archaeological excavation was carried out on several prehistoric sites in the vicinity of Porden Point and Port Refuge, Devon Island, in the latter half of July. The first half of August was spent in assessing the archaeological potential of two areas of Bathurst Island: the central lowland, known as Polar Bear Pass, and Broome Point. In all four localities, material recovered ranged from the earliest known prehistoric Arctic cultures of approximately 4000 years ago to late prehistoric Inuit material approximately 3000 years old. The work was done by a crew of three, using logistic assistance from the Polar Continental Shelf Project.

The Thule Archaeology Conservation Project jointly funded by the National Museum of Man and DIAND fielded four crews on Somerset Island, near Pangnirtung, near Cumberland Sound and Clyde, and on Broughton Island, respectively. The emphasis was on excavation of major sites from which whale bone could be collected and stockpiled for use by local carvers. Continued survey work revealed the locations of several previously unknown sites, and the Broughton Island crew rescued two houses threatened by erosion at MhBw-3.

Barrenlands

An archaeological party of seven devoted six weeks to the completion of excavations at the Duc site (KjNb-7) on the Thelon River while two two-man parties carried out survey work elsewhere in the Thelon drainage. One of the surveys located over one hundred sites during three weeks of work on the Elk and upper



The laboratory building at the High Arctic Research Station on Bathurst Island, NWT

Thelon Rivers. The other survey party found one large stratified site and several dozen surface and buried sites around Whitefish, Lynx, and Howard Lakes at the Thelon headwaters. This work, begun in 1970, completed the Thelon River survey from headwaters to salt water, and the overall project resulted in the location of over 500 sites from four major archaeological traditions: Northern Plano Agate Basin, Shield Archaic, Arctic Small Tool, and Talttheilei.

Mackenzie Basin

A survey was carried out by canoe around the western and northern shores of Great Bear Lake for the purpose of determining the nature and extent of archaeological remains there. Surveying was accomplished by coast-

wise cruising with frequent stops for inspection. Only sparse evidence of prehistoric occupation was found on the western shores of Great Bear Lake, and moderate evidence was discovered along the northern shores. Camp sites represent a number of early cultures, among them a Paleo-Eskimo intrusion of about 3000 years ago.

Yukon

Prior to the Great Bear Lake survey (see above), the same party examined the Engigstciak site in northern Yukon which previously had been excavated by the National Museum nearly 20 years ago. This work enjoyed the logistic support of the Polar Continental Shelf project and was designed to assess the potential of the site for further excavations as

well as to form a better basis for a re-examination of existing collections from Engigstciak. Frost prevented the exposure of deep culture-bearing muck and sand layers, but materials representing the Arctic small tool tradition and later phases were recovered from appropriate strata. Although each of the seven test pits yielded some material, the rate of recovery was poor and it is doubtful that the site warrants renewed major investigation.

The Yukon Refugium Project of the National Museums of Canada and the Geological Survey of Canada continued field work in the Stewart River and Old Crow valleys as well as completing one month of reconnaissance in and around the Bonnet Plume basin of northeastern Yukon. The Stewart River and Old Crow work consisted of further field

checking of problems arising from the 1975 field season, while the activities in the Bonnet Plume basin were directed toward the correlation of geological and paleoecological data near the late Wisconsinan ice margin with comparable data previously developed in and around the basins of Glacial Lake Old Crow. Abundant stratigraphic data and numerous excellent paleoecological samples were obtained, but specifically archaeological results were somewhat disappointing.

The ongoing development of the Aishihik Power Project necessitated rescue archaeological work in the Aishihik Valley of Southwest Yukon. A crew of six carried out excavations at Old Aishihik village (JVi-1), as well as minor excavations at the Chimi site (JVi-7) and others previously recorded in the area. Fifteen new sites or find spots were also recorded.

Plans for 1977-78

Further archaeological work will be conducted at sites found in 1976 at Brooman Point.

Excavations will be conducted at the large stratified sites at Whitefish Lake at the Thelon headwaters, and a survey will be made around Cree Lake in northern Saskatchewan. The Cree Lake survey has been devised to: trace Agate Basin components southward from their known occurrence in the barrens-lands; trace possible Pre-Dorset penetration south of Lake Athabasca; and to assess the transitional region between the ranges of bison and caribou herds and evaluate the prehistoric adaptations related to each of them.

The Yukon Refugium Project will focus on the Pelly and Stewart rivers in central Yukon and will devote at least one month to intensive excavations at selected localities in the Old Crow region of northern Yukon. These efforts will be directed toward the discovery of undisturbed deposits of paleontological and archaeological significance.

National Museum of Man (NMM)

Canadian Ethnology Service

Responsibilities

To document the cultural heritage of the native peoples of Canada, including research, material culture collection, and analysis and dissemination of information on the social, linguistic and material culture of the Indians and Inuit of the Yukon and Northwest Territories.

Review of 1976-77

Inuit Research

Staff research continued on kayak construction and use. An ethnographic film study of family life at a summer fish camp was undertaken at Rankin Inlet, NWT.

The Urgent Ethnology Program continued to support research by contract including:

lexicological study of the Eskimo language; study of the cultural basis of Eskimo social relations;

study of ethnopsychology and emotional expression in Cumberland Sound, NWT;

study of Netsilik Eskimo music from the communities of Gjoa Haven, Spence and Pelly bays;

film study of modern Eskimo subsistence techniques in the vicinity of Coral Harbour; contemporary arts of the Canadian Inuit by examination of Inuit aesthetic concepts, their development and transmission; and An examination of the nature and distribution of commercial whaling operations in the Western Canadian Arctic to determine the impact of these operations on the size, distribution, health, economy and material culture of the Eskimo populations.

Athapaskan Research

Staff continued to examine land use, territoriality and spatial organization of northwestern Athapaskans and co-ordinated the following contracts:

an age graded comparative linguistic study and completion of a bilingual dictionary of the Hare language as spoken in Fort Good Hope, NWT;

study of the language of the Central Mackenzie River Athapaskans;

examination of the culture of the northern Tutchone Indians to increase our knowledge of these Indians for the period 1880-1910;

study of the ritual life of the Ross River Indians;

study of the cognitive concepts of the Slavey speaking Athapaskans at Fort Liard, Fort Simpson and Fort Nelson, NWT;

collection of biographies of Athapaskan women between the ages of 40 and 85 living in villages in the Yukon; and initial linguistic survey of the inter-relationships among the Tagish, Tahltan and Kaska Athapaskans of the Yukon Territory and Northern B.C.

Plans for 1977-78

Inuit Research

The major aspect of staff research will continue to focus on kayak design, construction and utilization.

In addition to continuing support on some of the above listed contracts, the following new study will also be sponsored:

study on the Inuit musical culture of Rankin Inlet and Eskimo Point with the following objectives:

to record on tape, transcribe into musical notation, translate into English and transliterate into syllabics traditional Inuit songs; and to

prepare two songbooks for use in schools in Rankin Inlet and Eskimo Point.

Athapaskan Research

Research will continue on Athapaskan land use, territoriality and spatial organization.

Support for some of the previously listed Athapaskan contracts will continue and the following new contracts will be funded:

to obtain translations and clarification of 25 tape recordings of previously recorded Tutchone texts, oral tradition and music and to collect additional contact-traditional sociocultural information in the vicinity of Aishihik, Yukon for eventual incorporation into a comprehensive ethnography on the Southern Tutchone and also for use as supplementary background material for use in a Peoples of the Yukon High School text requested by the Council of Yukon Indians; and

a sociolinguistic investigation of the six known linguistic variables in Dogrib, (1) to determine where there are definable sociocultural correlates of these linguistic variables and subsequently, to characterize and explain linguistic changes currently in progress and (2) to elicit data to fill gaps in previously collected paradigms.

National Research Council of Canada (NRC)

Responsibilities

Investigations into various phases of pure and applied sciences in northern Canada.

Herzberg Institute of Astrophysics

Review of 1976-77

Continuous monitoring of cosmic ray intensities was carried out at Alert and Inuvik in the Northwest Territories. This work is part of an international program based on a worldwide network of cosmic ray monitors. The data is sent on a regular basis to the World Data Center and is distributed to interested scientists.

Plans for 1977-78

The cosmic ray monitoring program will continue at the same level through 1977-78.

Division of Chemistry

Review of 1976-77

Recent evidence that extensive deposits of natural gas hydrates exist in the Mackenzie Delta and elsewhere in northern Canada has engendered laboratory studies of certain fundamental properties (nuclear magnetic resonance spectra, dielectric absorption, thermodynamic stability) of these solids. Some of the goals of the studies are the development of physical methods of detection, analysis of gas hydrates and the improvement of methods of predicting the conditions under which they should occur.

In collaboration with the Northern Non-Renewable Resources Branch of the Department of Indian and Northern Affairs and the Division of Seismic and Geothermal Studies of Energy, Mines and Resources, estimates are being done to determine the amount of natural gas likely to occur in the hydrate form.

Plans for 1977-78

The gas hydrate studies will be continued.

Division of Building Research

Review of 1976-77

Additional ground temperature cables were installed in 1976 and permafrost temperatures measured regularly at various locations near the boundary between the discontinuous and continuous permafrost zones and along the proposed Polar Gas pipeline route in Keewatin District, NWT.

Observations on several insulated permafrost test sections on the Mackenzie Highway

near Inuvik, NWT were continued. Additional instrumentation and monitoring equipment was installed in September 1976 at the uninsulated test site on the highway near Wrigley, NWT and the continuous measurement of ground temperatures initiated. An insulated test section, instrumented for measurement of ground temperatures and movements was constructed on permafrost at Mile 237, Dempster Highway, YT in March 1977. Pile foundations for the Eagle River bridge, Dempster Highway, YT were constructed in permafrost and instrumented in September 1976.

Laboratory studies of the mechanical and thermal properties and deformation behaviour of frozen soils and of model pile foundations in frozen ground were continued in the division's cold rooms. Studies of frost action effects on the operation of chilled gas pipelines in permafrost areas were continued in the laboratory.

The Development of Experimental Techniques for investigating the microstructure of sea ice and the determination of the structure, mechanical properties and rheological behaviour of fresh water ice were continued in the laboratory cold rooms. Research on problems related to modelling the interaction between floating ice covers and fixed structures was undertaken.

Advice and assistance on northern building and geotechnical problems was provided to a number of industrial firms and government departments and agencies.

Plans for 1977-78

The studies of insulated and uninsulated embankments constructed on permafrost on the Mackenzie and Dempster highways will be continued. The performance of the Dempster Highway, Eagle River bridge foundations will be monitored regularly. Permafrost ground temperature measurements will be continued in the Keewatin District, NWT.

Laboratory studies of frozen soils (including model foundations), sea ice and fresh water ice will be continued. The development of load transducers for the measurement of ice forces on large Arctic offshore structures will be undertaken so that these can be installed during the 1977-78 winter.

National Aeronautical Establishment

Review of 1976-77

The North Star aeromagnetics research aircraft operated by the Flight Research Laboratory of the National Aeronautical Establish-

ment carried out another Arctic geomagnetic reconnaissance in April 1976. The reconnaissance involved a survey of the Gulf of Boothia and Admiralty Inlet. Lines were flown at 330 m above sea level with 39 km spacing. This was the last aeromagnetic survey operation for the North Star before being re-tired as a research aircraft.

Plans for 1977-78

No similar aeromagnetic operations are planned until the completion of installations and testing of the Convair 580 aircraft, currently being modified by the National Aeronautical Establishment as a replacement for the North Star, is complete.

Division of Mechanical Engineering

Review of 1976-77

The Churchill Harbour model study conducted by the Hydraulics Laboratory, was completed in January 1977 and the final report submitted to the National Harbours Board. Laboratory tests of wave forces on offshore structures is continuing and various reports have been published. Direct applications of the developed theories to the design of marine structures can now be made. A literature study on the resistance to flow caused by the reconsolidation of broken ice covers was completed and published.

The Marine Dynamics and Ship Laboratory served on a government committee investigating air cushion vehicles (ACV) ice-breaking techniques and took part in planning and analyzing various projects especially the analysis of the data from the "Alexander Henry" trials.

In co-operation with Canmar (Dome Petroleum) the Ship Laboratory developed procedures during the 1976-77 winter, for using waste heat water to keep an area from freezing around a ship in the shore-fast Arctic ice zone. The optimum size and number of nozzles for general application has been developed and the effects of an impressed current also investigated. By studying a 1/4 scale arrangement in the laboratory's open air manoeuvring tank, it is now possible to relate the open water area to environmental conditions as a result of monitoring the various parameters during the experiment and relating these to theoretical concepts. Work on this subject led by Canmar is continuing at Resolute Bay.

Model tests and developments using synthetic-material model ice are being carried out by the laboratory for existing and proposed

new ships. One of the ships being tested is for the Department of National Defence. The technique is being refined as a useful adjunct to that carried out in a temperature-controlled ice tank.

Planning for a proposed controlled-low-temperature ship model tank has been undertaken to provide information for the National Research Council and Transport Canada. Another project in the planning stage concerns arctic vessel research, including research and the planning of instrumentation for the "M.V. Arctic", which performs icebreaking and Arctic search and rescue operations.

Advice on power and performance requirements for Arctic LNG carriers was provided mainly to consultants.

Plans for 1977-78

Work carried out last year will be continued in 1977-78 with particular emphasis on model tests and development of experimental techniques.

Space Research Facilities Branch

Review of 1976-77

Upper atmospheric research activities in the Arctic were confined to the Branch supporting ground based measurements on behalf of the Universities of York and Western Ontario at Cape Parry and Cambridge Bay, NWT in July 1976 and the University of Western Ontario at Cambridge Bay in Nov/Dec 1976. Engineering studies were directed toward strengthening the High Altitude Diagnostic (HAD) launcher at Cape Parry, NWT to increase its capabilities of lifting heavier rocket and payload combinations, proposed for the winter of 1977-78.

Plans for 1977-78

The role of the Churchill Research Range will be extended July 1, 1977 to support upper atmospheric research programs at Churchill, Great Whale River, (Poste-de-la-Baleine, P.Q.), the Cape Parry rocket site and other expeditionary Arctic sites. The proposed 1977-78 winter rocket program for Cape Parry will consist of two Nike-boosted Black Brant VB rockets carrying multi-experiments for investigations into the characteristics of the dayside magnetospheric cleft, particles and ionospheric measurements and three Black Brant VI rockets carrying a coherent pulse radar system for a synoptic study on the detection of electric fields in the polar cap ionosphere. Coincident with these launchings,

ground based observations will be made at Sachs Harbour and Mould Bay.

In preparation for these launches, the necessary on-site improvements will be made during a two-week period in August/September 1977.

Division of Electrical Engineering

Plans for 1977-78

Increased oil and gas exploration in Arctic waters involves shipping and building of artificial islands necessitating measurements of the ice thickness of varying salinities by electro-magnetic and acoustic radiation over a broad frequency spectrum. The development of a radar system for the measurement of ice thickness from an airborn platform will be undertaken based on these results.



Preparing rocket launcher for winter operation at Cape Parry, NWT

Northern Canada Power Commission (NCPC)

Responsibilities

To provide public utilities in the Yukon and Northwest Territories and at other locations in Canada, as authorized by the Governor-in-Council. To operate from consumer revenue on a self-sustaining basis in each rate zone, including repayment of capital expenditures borrowed from Canada.

Review of 1976-77

Gross generation of electrical energy in the North for 1976-77 approximated 650 million KWH for a decrease of five per cent from the previous year's output. Operating expenses increased due to higher wages, fuel prices and transportation costs. At the same time, several factors had a diminishing effect on operating revenue. These included a reduction in sales, related to the general economic conditions in the North; the effect of strikes in the mining industry; late implementation of rate increases; and low water levels in the Snare Hydro system. As a result, the commission will be in a deficit position for the 1976-77 fiscal year, as in the previous two years.

During 1976-77, the net diesel electrical capacity was increased by 13 455 KW and hydro by 9500 KW, however, the increases in peak load requirement were not as high as previous years due to an unusually mild winter.

The additional diesel units ranged in size from 2500 KW at Pine Point to 100 KW at Arctic Bay and Arctic Red River. No new powerhouses were installed, but generating units were added to 26 existing plants. Fuel oil storage was added at seven sites totalling 818 298 l.

Employee housing was constructed to accommodate a new full-time superintendent in Fort Franklin.

In addition to the installations described above, work has begun on the engineering and purchase of three 2.5 MW diesel units to be installed at Pine Point for Cominco mining operations.

The Snare Forks Hydro Development (installed capacity: 4.8 MW firm) was commissioned on November 15, 1976. The plant is currently being operated on local manual control and completion of remote control is scheduled for the summer of 1977. With the addition of the latest Snare plant, the installation of the computer assisted control system for the complete Snare system is being installed.

Four IMW Ossberger Turbine generator units are being commissioned as an addition to the existing 18 MW Taltson plant. These

units have been in continuous manual operation since April 1, 1977. The size of these units allows for future relocation if required.

The computer controlled supervisory system for the Whitehorse System is nearing completion and is expected to be installed and operating by mid-summer, 1977.

In line with Northern Canada Power Commission's objectives, more emphasis was placed on maximizing existing equipment to reduce capital expenditures during 1975-76. Increasing parallel operations of units was put into effect with resulting economies being shown in operating costs.

The sale of waste heat from thermal plants was also increased resulting in better plant utilization which will be continued.

Budgetary control systems were improved, the net result being a reduction in capital expenditures of between 10 and 12 per cent.

Construction costs were reduced where possible by simplification of design and a complete modular thermal unit was designed, built, commissioned and tested in Edmonton and then transported to Fort Simpson for testing under Arctic conditions. The modular concept is expected to considerably reduce construction costs in future years.

In line with the new philosophy of design and operation of plants, training and retraining of personnel has been given more priority and various training schemes have been set up in conjunction with the Department of Manpower.

A task force, set up by the Minister of Indian Affairs and Northern Development, released its findings in a report on electrical energy costs in the North, published in November, 1976.

The total number of projects completed during the year were:

Thermal [82]

Hydro (Snare Forks, Taltson Mobiles) [2]
The major Thermal Projects included in the above total were:

Whitehorse — purchase and installation of reactors

Inuvik — installation of K-8 diesel-generator unit

Inuvik — purchase and installation of 30 MM BTU HTW boiler

Frobisher — purchase and installation of 30 MM BTU HTW boiler

Resolute Bay — purchase and installation of 2 X 900 KW diesel-generator sets

Pine Point — purchase and installation of 2500 KW MLW unit

Engineering studies completed (or in progress) during the year are:

Waste heat recovery to supply community facilities

Standard power house design

Diesel plant expansion studies

Digital AVR investigation

Modular unit design optimization

Demand metering/fuel consumption design study

Automatic synchronizing load sharing study

The following projects initiated in 1976-77 are scheduled for completion in 1977-78 as provided for in that budget:

Yellowknife — Alternate Substation

Fort Smith — 6 MVA Transformer

Frobisher — Plant improvements for Safety

Baker Lake — 6 666 Barrel Fuel Storage Tank

Fort Norman — Feeder Switchgear

Clyde River — 300 KW Unit and Feeder Switchgear

Broughton Is. — 300 KW Unit Installation

Lake Harbour — 300 KW Unit and Feeder Switchgear

Hall Beach — 300 KW Unit

Northern Transportation Company Limited (NTCL)

Responsibilities

Northern Transportation Company Limited has operated throughout the Mackenzie River system and the Western Arctic coast for over 40 years. The company's marine operations have been the principal transportation lifeline serving general community freighting needs and providing logistics support for oil, gas and mineral exploration and development. Since 1944, NTCL has transported in excess of 5 Mt of freight over its 8 046 km system. NTCL operates a fleet of three ocean-going ships, 29 diesel tugs and 167 all-steel, dual-purpose barges with capacities of up to 2 286 t providing an aggregate gross tonnage in excess of 104 000 t. The marine operations are supported by a trucking subsidiary. During the normal May to October navigational season, NTCL employs approximately 900 persons, many of whom are residents of the region it serves.

Review of 1976-77

During the year under review a total marine volume of 288 544 t was handled. This constitutes a decline of 64 008 t or 18 per cent compared to the 1975 traffic volume of 352

552 t. Freight destined for the Mackenzie sector dropped by 40 640 t but more financially significant was the decrease of 31 496 t or 84 per cent to Alaska North Slope. NTCL registered a slight increase of 6 096 t in the Athabasca Area and a modest increase of 2 032 t in the District of Keewatin in the second year of service.

For reasons largely beyond its control, NTCL has in the past four years been subjected to a continuous decline in tonnages handled as well as the mounting pressures of higher wages and the rising cost of supplies and services.

Favourable operating conditions persisted throughout the Athabasca, Mackenzie River, Western Arctic and Keewatin route systems during the majority of the 1976 shipping season. As a result of the auspicious sailing conditions, the fleet was able to deliver its cargoes and effect an earlier return to home port thus affording additional time for shipyard inspections and planned maintenance.

In keeping with the tonnage reductions which were forecast for the 1976 shipping season NTCL de-activated 10 vessels. In response to the continuing decline in freight

expectations, NTCL plans to lay up an additional two vessels during the 1977 navigational season.

Grimshaw Trucking and Distributing Ltd., a wholly-owned subsidiary, is a common carrier operating over 250 units of rolling stock and 10 terminals, three of which are located in the Northwest Territories. NTCL's service, consisting of inter-community movement of general commodities and contract transportation, complements the water transportation system making intermodal service possible at Hay River, Northwest Territories, and Fort McMurray, Alberta. The year produced a record traffic volume of over 85 000 t.

NTCL's air cushion vehicles (ACV's) were once again utilized to support offshore Arctic drilling operations in the Beaufort Sea. The hovercraft were used principally for personnel transport, cargo resupply and safety standby services under contract to a major oil company. The demand for the type of service provided by these vehicles has diminished greatly in the past two years; therefore, it has been decided to suspend the operation until it can be economically sustained.

Plans for 1977-78

NTCL does not anticipate any increase in marine tonnage for 1977 and it is expected that only the portion of the fleet will be mobilized that will ensure the efficient delivery of all marine cargo. In view of the uncertainty surrounding the 1977 season; a capital expenditure program of \$175 000 will be directed at completing improvements to some shore facilities and the ongoing replacement of material handling equipment.



Loaded barge delivers cargo up the MacKenzie River

Post Office Department (PO)

Responsibilities

Provision of postal service in the Yukon and Northwest Territories.

Review of 1976-77

Postal service for Resolute, NWT was improved through a reclassification to a semi-staff Post Office. Service to Strathcona Sound, Pond Inlet and Igloolik was increased from once to twice weekly.

Plans for 1977-78

Provision will be made for the expected demand for postal service to the hydro carbon resource development and pipeline construction activities.

Revenue Canada (RC)

Customs and Excise

Responsibilities

To administer the Customs and Excise laws and regulations, particularly those relating to effective Customs control over the movement of aircraft, vessels, goods and persons into and out of Canada.

Review of 1976-77

The local port of Whitehorse under the purview of the Regional Collector, Vancouver, continues to administer Customs laws and regulations throughout the Yukon Territory. The territory is serviced by all modern transportation media engaged in the importation and exportation of goods and the international movement of passengers. To accommodate this traffic, Customs outports were maintained at Beaver Creek, Dawson, Little Gold (summer months only), Old Crow and Pleasant Camp. Customs formalities at Old Crow are performed by the RCMP. Six locations were approved as Customs airports of entry and service was provided for highway sufferance warehouses at Whitehorse and Dawson. Special arrangements were made to accommodate river traffic leaving and re-entering Canada on the Yukon-Porcupine River route.

The port of Edmonton provides service to a reporting station for aircraft at Yellowknife, NWT, on 72 hours notice and maintains an outport for enforcement purposes at Inuvik, NWT. Service at Yellowknife is performed by officers from Edmonton on an "on call" basis. While at Inuvik, our officer is a full-time employee. The RCMP continue to provide service at Frobisher, NWT, under the guidance of Customs headquarters in Ottawa. Service at this location, however, is restricted to the acceptance of inward passing and outward reports only.

During the year, exploration activities of both a commercial nature, (the development of oil and mineral resources), and of a non-commercial nature (geographical and mountaineering expeditions) continued with increased intensity. Oil exploration activities with the attendant increased cargo deliveries into northern areas have required closer surveillance by Customs personnel. Increased activity in this area is necessitated to assess reporting and accounting procedures and to enforce custom regulations involving imported goods. Officers from the ports of Edmonton and Vancouver continue to make several jo-

urneys into the territories to examine these aspects of the department's interest.

Vessel cargo deliveries increased during 1976-77. The main shipping activity is the delivery of oil exploration supplies and petroleum products to various locations in the territories. The total number of cargo vessels increased with Transport Canada icebreakers continuing to operate during sealift operations. The co-operation of members of the RCMP and officials of other government departments performing Customs enforcement for Revenue Canada proved to be an invaluable asset.

Locations for Customs service in the North, other than at the places described above, under the jurisdiction of the Customs ports of Whitehorse and Edmonton appear below under the headings of the government department or service whose employees perform the duties.

Royal Canadian Mounted Police

Baker Lake
Cambridge Bay
Clyde River
Coppermine
Eskimo Point
Lake Harbour
Pangnirtung
Pond Inlet
Resolute
Sachs Harbour
Spence Bay
Tuktoyaktuk

Department of National Defence

Cape Dyer
Cape Parry
Hall Beach

Transport Canada

Coral Harbour
Department of Fisheries and Environment
Alert
Eureka
Isachsen
Mould Bay

Plans for 1977-78

Due to increased commercial activity in the territories and the Arctic Archipelago, the adequacy of Customs control will be examined and monitored to determine the requirements for Customs surveillance and service.

Royal Canadian Mounted Police (RCMP)

"G" Division

Responsibilities

The Royal Canadian Mounted Police — "G" Division is responsible for policing the Northwest Territories; to enforce laws, prevent crime and maintain peace and security. In this capacity the RCMP acts as a federal as well as a territorial Force under contract to the territorial government. "G" Division, with its headquarters at Yellowknife, has three subdivisions: Yellowknife, Inuvik and Frobisher, with a total of 35 Air detachments. Located at Yellowknife, Inuvik and Frobisher provide vital support service to police operations.

Review of 1976-77

The overall crime picture shows an approximate increase of five per cent for 1976-77. Approximately 95 per cent of the more serious crimes — homicide, sexual offences, assaults, are related to liquor. The NWT continued to have the highest ratio of crime in relation to population in Canada. The majority of crime results from problems caused by liquor. Attempts at prohibition were made at Frobisher and Rae and such restrictions are being considered in other smaller communities. Although initial reaction to the prohibition indicated a drop in liquor offences and liquor-related offences, it is too early to determine the specific results. In addition to strict enforcement, radio and television facilities were used to educate people about the misuse of alcohol. Drug offences have almost doubled necessitating more enforcement.

The RCMP continued to promote crime prevention activities and to establish good community relations. A joint effort with the Department of Social Development, other federal and territorial departments and private organizations is now underway to establish a public awareness program on alcohol abuse.

"Operation Identification", a crime prevention program, was implemented in 12 communities in the Northwest Territories. The local Yellowknife Rotary Club sponsored a program which involved the identification of all valuables in the home with an electric pencil using a personal identifying mark, recording the valuables in a brochure and placing stickers on the front and rear doors as a warning to intruders. This program focused on reducing break, enter and theft. The RCMP was actively involved in various community activities: coaching sports; school visitation programs; promoting ski-doo, firearms, traffic and

highway safety programs. RCMP members worked with Chiefs and Band Councils.

There was a slight increase in the number of incidents of willful damage to police buildings and other property. The RCMP Protection of Property Section began surveying government buildings and up-grading them to suitable security standards.

Telecommunications facilities continue to be improved.

New detachments opened at Fort Franklin, Snowdrift and Nanisivik. "G" Division assumed responsibility for policing the Belcher Islands, which had been policed through rotational patrols by the Frobisher Detachment.

The system of providing Rotational Police Services to remote settlements without permanent detachments was well established. More and better equipped patrol cabins were provided to allow RCMP officers to conduct

their duties more efficiently on a regular basis.

Efforts to recruit natives as members of the Force as well as public servants have been continued. The Native Special Constable members recently completed a three-week police training course at the RCMP Training Academy at Regina, Saskatchewan. A small number of students will be hired as Supernumerary Special Constables during the forthcoming summer under the Summer Student Employment Program.

Construction of the new detachment building at Fort Simpson was completed in 1976-77. Seven double-wide trailers have been set up at Frobisher to house additional married personnel. A temporary detachment has been set up at Hay River until the permanent building to replace the one destroyed by fire in February 1976 is constructed. Additional housing units were installed at Rankin Inlet and Fort Franklin.



New detachment building in Fort Simpson

Plans for 1977-78

A Commercial Crime Section will be established at Yellowknife with New Identification Sections planned for Hay River and Frobisher. Emphasis will be placed on Customs and Excise Enforcement with the establishment of RCMP Sections planned for Yellowknife and Frobisher. Plans are also underway to establish detoxification centres.

"G" Division will assume responsibility for

policing of Port Burwell, NWT, now under "B" Division, Newfoundland.

A new detachment at Sanikiluaq on the Belcher Islands is being planned.

One man detachments will be changed to a minimum of two members in order to provide a better response time on complaints and support purposes. Increases in manpower at certain locations are forecasted to meet operational requirements.

To accommodate the increased personnel

at divers locations, 10 double-wide trailers to serve as married quarters will be installed along with five replacement housing units. Patrol cabins will be installed at Broughton Island, Chesterfield Inlet, Whale Cove, Coral Harbour and Paulatuk to facilitate rotational patrol service to the settlements.

“M” Division

Responsibilities

The RCMP – “M” Division is responsible for policing the Yukon Territory – to preserve the peace and maintain law and order, which includes the enforcement of federal statutes and territorial ordinances. The staff, made up of regular members, civilian members and public servants, totals 106.

Review of 1976-77

The new “M” Division Headquarters and Whitehorse Detachment Complex was completed and officially opened on September 17, 1976.

Double-wide trailers were set up at Carcross and Beaver Creek and are being used as a combined residence and detachment. Additional units were set up in Teslin, Faro, Watson Lake and Ross River as married quarters.

Carcross was established as a permanent detachment as of September 1, 1976, with a married corporal in charge.

A permanent Police Community Relations Unit has been established with a corporal in charge. Combined with these duties, this member is also responsible for our In-Service Training.

A Planning Section/Division Data Analyst Unit was established as of December 1, 1976.

A Security Service Unit was established on February 1, 1977 with a Sergeant in charge.

Due to the Yukon's continuously high impaired driving rate, the Yukon Territorial Government is still participating in a prevention program "Yukon Stop Check".

Four Alcohol Level Evaluation Road Testers, commonly referred to as ALERT, and four breathalyzer instruments were obtained.

A citizens band radio for emergency purposes was donated to the Force by the local Citizens Band Club and set up in Telecommunications Complex.

The Division Property Manager's position and the Police Service Dog position were filled.

Installation of the VHF/FM Radio Telecommunications System was completed.

Plans for 1977-78

Setting up of double-wide trailers in Teslin, Haines Junction, and Dawson City; also the establishment of a new detachment complex at Ross River. Renovations will also be carried out to offices at Teslin, Watson Lake and Mayo.

Two breathalyzer units and four ALERT units will be in operation before the end of 1977-78.

A Commercial Crime Section will be established; along with establishment of a Senior NCO Staffing Interviewer (who will double as a Training NCO);

establishment of an additional S/Cst. position to serve legal documents; and establishment of a Protection of Property Section in Whitehorse.

Secretary of State (SS)

Bilingualism in Public Administration

This program offers provincial, territorial and municipal administrations assistance in developing the use of both official languages to serve the public. The program includes federal language training courses to provincial and municipal public servants offered through the Language Bureau of the Federal Public Service Commission; support to provincial second-language training programs; and contributions towards the costs of translation of provincial statutes and regulations.

Provincial participation in the early years of the program was quite limited (e.g. the total amount claimed by all participating provinces was \$280 000), but this has increased substantially in the last year.

The Government of the Yukon Territory participated in the program for the first time in 1976-77, receiving approximately \$8 500 in federal contributions towards the costs of territorial second-language training programs and has indicated its intention to seek federal assistance under the terms of the program once again in 1977-78.

Language Programs Branch

Bilingualism in Education

Responsibilities

To provide greater opportunity for members of the majority official language group in each province or territory to acquire a knowledge of their second official language; and for the minority official language group in each province or territory to be educated in their first official language.

Review of 1976-77

Upon the request of both territorial governments, the branch renewed for the third consecutive year its assistance towards the official language program of both departments of education.

In the Northwest Territories, the following highlights reflect the continued progress made during 1976-77 through the special arrangements to promote bilingualism in education in the North:

- expansion of French programs to schools where previously not offered;
- acquisition of resource materials for the French Resource Centre to be used in schools across the NWT;

in-service training for French teachers; bursaries for up-grading skills of French teachers;

appointment for a limited period of a French consultant to co-ordinate and further develop French programs.

In the Yukon, the federal assistance to French-language programs was used in the following ways:

- the salary of a full-time French Programs Co-ordinator;
- student exchanges between the Yukon and the Province of Quebec;
- development of curriculum to be followed in elementary schools;
- teacher workshops and in-service training;
- acquisition of resource materials and additional equipment for the French Language Centre located in Whitehorse; and
- creation of non-credit French-language courses for adults.

Plans for 1977-78

Under the terms of the federal-provincial program for Bilingualism in Education, the Secretary of State has agreed in principle to extend its support to the territories until expiry of the present agreement on April 1, 1979. The level of support and the activities funded during 1977-78 are subject to submission of progress reports and an identification of needs by both territorial governments.

Citizenship Sector

Responsibilities

The Citizenship Sector is responsible for the planning and implementation of social and cultural programs designed to encourage the fullest participation of Canadians in society. Objectives of the sector include to: reinforce national unity and identity; encourage cultural awareness and appreciation of diversity of heritage within a bilingual framework; and to preserve and reinforce the recognition and observance of human rights and fundamental freedoms.

Review of 1976-77

The program delivery system for the Northwest Territories and the Yukon is administered through the department's Prairie and Pacific regional directorates respectively. Continued support for the operations and activities of native associations, native friendship centres and communication societies accounted for the predominance of expenditures

in 1976-77. Numerous social and cultural development grants were provided to women's groups, ethnic groups and native groups in response to individual project submissions.

Plans for 1977-78

Continued emphasis on the decentralization of field authority from headquarters will enhance public access to the resources and services of the sector and increase participation of citizens in departmental programs.

Statistics Canada (SC)

Review for 1976-77

In 1976-77 the national Quinquennial Census of Population, Housing and Agriculture were conducted in the Yukon and Northwest Territories. A feasibility study on extension of the Labour Force Survey to the Yukon was carried out in co-operation with the Department of Indian Affairs and Northern Development. A feasibility study was also carried out for the Department of National Health and Welfare concerning a Recreation and Physical Fitness Survey.

Transport Canada

Arctic Transportation Agency

The Arctic Transportation Agency determines and controls development of the transportation infrastructure in the territories which comes under Transport Canada. The agency aims to provide multi-modal transportation systems which will contribute to the achievement of the national objectives for northern Canada. To do this most effectively, it is necessary to continually assess the alternate uses to which the limited transportation resources may be applied, and to establish priorities.

Co-ordination and consultation with the territorial governments, industry and other organizations, is essential. The agency is involved in formulating an intermodal plan for transportation system in the territories, including the air and marine modes as well as the use of road, rail, pipeline, hovercraft and other facilities, so as to ensure appropriate and improved services on an integrated basis in the North and to ensure that future government programs will reflect the variety of modes which will prove to have the greatest cost benefits to the northern residents.

Co-ordination with other government departments and agencies is carried out through the Advisory Committee on Northern Development and the Task Force on Northern Oil Development. The role of Transport Canada and the activities of these committees is centered in the Arctic Transportation Agency, and its administrator is chairman of their respective transportation sub-committees.

A consultative approach is being used to determine the major problems and opportunities of northern transportation; these must be considered in developing a national transportation policy. Three general areas are under study: the Yukon, the Mackenzie Valley, and the Hudson Bay Arctic Islands. The Quebec-Labrador-Newfoundland corridor has also been included in the study because its transportation problems are similar to those in parts of northern Canada.

The agency continues to accelerate development of the projects which will satisfy the growing needs resulting from changing requirements in the North. Work on formulating a railway development strategy is being carried out by the Yukon Territorial Government and federal officials in accordance with Transport's policy principles announced in June, 1975. Studies are underway to identify problems and opportunities for improvement

existing in the transportation of consumer and industrial goods into the Mackenzie Valley. A similar study on the Yukon was completed and published in 1976.

Implementation of the comprehensive policy to upgrade airports and air navigation facilities and services in the Canadian Arctic, approved by Cabinet in February 1974, is continuing. It is anticipated that more than \$32 million will be spent on the construction operation and maintenance of such facilities during 1976-77.

An important part of the program is training residents of remote communities to operate and maintain the airport and associated facilities. Including the operation of vehicles for summer and winter maintenance of runways and aircraft parking areas and communications services and meteorological observing responsibilities. The improved terminal facilities and navigational aids, together with radio communications and meteorological services, will result in a more reliable air service for the smaller communities in the North.

A brochure entitled, *Arctic Airports* in French, English and Inuktitut has been distributed throughout the North to explain Transport Canada's Arctic Airports Program. Further brochures on airports, training and air service regulations are planned.

A study of Arctic air services has been completed and recommendations for policy action and program changes are being developed. A statement of principles is proposed which will establish minimum service criteria for Arctic air services, especially for those to smaller communities now served irregularly. The DeHavilland Dash 7 aircraft is being evaluated as a cost-effective solution to improve air services for a number of areas.

A proposal for major channel improvements on the Mackenzie River is in preparation and environmental assessment is in progress.

The Arctic Transportation Agency maintains close contact with the territorial governments and organizations in the North. It responds to various requests for assistance concerning Transport Canada's role in the Arctic.

Canadian Surface Transportation Administration

Responsibilities

The Canadian Surface Transportation Administration exists, essentially, to foster the optimum development of the national surface transport system into an efficient modally-inte-

grated service, responsive to national economic and social goals, on a cost-recoverable basis wherever practicable, providing equal treatment for users.

Railway Transportation Directorate

Responsibilities

It is responsible for formulating policy proposals and ensuring that the operation, planning, and regulation of railways are consistent with national needs and government policy. Further duties involve planning and implementing railway programs consistent with such objectives, providing government with railway information, and conducting liaison with industry and provincial governments. The directorate is also responsible for ensuring that adequate resources are available for continual improvement of the railway system.

Review of 1976-77

As a follow-up to the completion of the Yukon Railway Study, the Railway Directorate heads an interdepartmental committee whose purpose is to define a potential development strategy for railway development in the Yukon. Officials from the territorial government, the departments of Fisheries and Environment, Energy Mines, and Resources, Indian Affairs and Northern Development and Transport Canada are participating on this interdepartmental committee.

Highway Transportation Directorate

Highway Branch

Responsibilities

The Highway Branch is responsible for developing a methodology for the evaluation of federal and provincial highway programs. The Branch negotiates and manages cost-shared highway programs and studies their inter-relationship with other modes of transportation. The Branch heads the Interdepartmental Highway Committee whose role is to review proposed highway investments south of 60° N by all departments of the federal government. The proposals are reviewed in terms of specific governmental objectives and with reference to supportive studies and analyses. It also heads the Interdepartmental Committee on International Bridges which co-ordinates all policy questions pertaining to bridges linking Canada and the U.S.



The development of the Arctic depends on transportation. Transport Canada's role in this development involves creating an infrastructure for air, marine and surface transportation.

Review of 1976-77

The main objectives of highway development in the territories are to provide highway connections with southern Canada and to construct road links to support developmental activities. To these ends, the Highway Branch participated in a number of interdepartmental and intradepartmental discussions on the subject of highway facilities in the North. The Branch also prepared material for and participated in discussions with the USA and British

Columbia which resulted in a Canada - USA agreement to reconstruct and pave the Canadian section of the Haines Road and the Alaska Highway from Haines Junction to the Yukon/Alaska border.

In addition, as part of the ongoing program of upgrading the Alaska Highway, phased upgrading of the Alaska Highway near Whitehorse and between Fort Nelson and Fort St. John by DPW has been strongly supported by Transport Canada.

The Branch presently cost-shares a research program by NRC south of Inuvik to examine insulating methods for highway construction on permafrost. The purpose of this study is to determine if polystyrene insulation can be substituted for conventional thick layers of fill which often have to be transported over long distances. Depending on the results, savings in construction costs on northern highways could be substantial.

Motor Carrier Branch

Responsibilities

The Motor Carrier Branch is responsible for the development of federal policies affecting the motor carrier industry and participates in strategic planning where it concerns passengers or freight which move extraprovincially on Canada's highway system.

Close contact is made with its provincial counterparts and liaison with the motor carrier and shipping industries. The Branch assisted in completion of a Bill concerning the regulation of movements of dangerous goods by motor carriers. It participated in several research programs with a view to improving general knowledge of the motor carrier industry. Branch members served on committees concerned with the motor carrier industry or its users.

Planning and Urban Applications Branch

Responsibilities

This branch is charged with the development, implementation and monitoring of transportation programs not included in other surface administration activities. This includes policy development for intermodal aspects and all urban transportation.

Review of 1976-77

The Whitehorse mini-bus began service on February 2, 1976. Capital was contributed by Transport Canada, while operating expenses are shared by territorial and city governments. The first year of service has been very successful.

Plans for 1977-78

During the 18-month trial period data is being collected to assess community impact, and to benefit similar small municipalities. A recommendation for future funding will be made during the spring of 1977 to the city and territorial governments by the Evaluation and Review Committee which represents the originating citizens group, and the federal, territorial, and city governments.

Canadian Air Transportation Administration

The Canadian Air Transportation Administration provides and operates domestic airway

facilities, a transborder, national and international air terminal system and the regulatory services needed for aviation safety. It also is responsible for the provision of air traffic control and international airway facilities and services in those areas (such as the North Atlantic) assigned by the International Civil Aviation Organization (ICAO), or for which Canada has otherwise accepted responsibility. Two directorates, Airports and Construction Services and Civil Aeronautics, provide facilities and services in support of civil aeronautics consistent with the protection of the environment. Air Administration advises and assists the Arctic Transportation Agency (ARTA) in the planning, programming and priority determination of aviation requirements in the Arctic, and is responsible for the budget formulation and implementation of approved projects.

Civil Aeronautics

Responsibilities

The Civil Aeronautics Directorate is primarily responsible for the Regulatory and Air Navigation Services program which is conducted under the Authority of the Aeronautics Act. The headquarters organization is responsible for policy and development, while the six air regions (Pacific, Western, Central, Ontario, Quebec, Atlantic) handle operations and maintenance. The Director General of Civil Aeronautics has six major responsibilities: develops legislation, standards and regulations for the control of civil aeronautics in Canada and establishes policy regarding licensing, inspection and enforcement; controls the movement of air traffic in Canada and other airspace for which Canada has accepted responsibility; provides, maintains and operates telecommunications and electronic facilities and services; determines national priorities for civil aeronautics requirements for facilities or services; establishes standards for control of civil aircraft, the investigation of aircraft accidents, overall security of civil aeronautics and promotes aviation safety; and directs the operational control of Transport Canada aircraft and helicopters.

Aeronautical Licensing and Inspection Branch

A Grumman G-11 has been acquired to assist in the flight inspection of aids to air navigation located in the Canadian Arctic. This

long-range, high-speed aircraft will, with the development of new methods and equipment, allow a more flexible and rapid response to the particularly difficult task of maintaining the standard of these aids.

Air Traffic Services (ATS)

Review of 1976-77

Air Traffic Services continued to provide area control service for flights operating under instrument flight rules in the Arctic Control Area of Canada. This area extends basically from 72° north to the geographical North Pole at and above flight level 290. The service provides protection and separation for commercial carriers operating between Europe and the Orient and for domestic flights operating north/south in to and out of the Arctic Islands. In support of this service, ATS operates a discrete telephone circuit from the Edmonton ACC to Cambridge Bay, NWT with switching arrangements at this point in the Reykjavik ACC in Iceland and with the Anchorage air route traffic control centre in Alaska.

In the Northern Control Area of Canada, area control service was provided for all flights operating at flight level 230 and upwards. Flights which benefitted from this service were commercial operators, operating between Europe and western North America, and domestic carriers and operators flying in Northern Canada. North of 60° Latitude in the Southern Control Area, area control service was provided to all aircraft operating at and above flight level 180.

In low-level airspace North of 60° Latitude, area control service was provided along designated controlled airways and within control area extensions.

In all that area of Canada North of 60° Latitude, air traffic control continues to provide information services and supplementary services to aircraft as required.

In the low level airspace, controlled airways existed between Fort Smith, Yellowknife and Inuvik, and along the Staging Route to Alaska. North of 60° Latitude, control area extensions were provided at:

Fort Smith — 50 NM radius
 Hay River — 50 NM radius
 Yellowknife — 50 NM radius
 Norman Wells — 50 NM radius
 Inuvik — 40 NM radius
 Whitehorse — 40 NM radius
 Fort Simpson — 25 NM radius
 Teslin — 25 NM radius
 Watson Lake — 25 NM radius

Frobisher — 40 NM radius

Control Zones for additional protection and improved service to the operators were provided at the following airports:

Fort Simpson — 5 NM radius

Norman Wells — 5 NM radius

Watson Lake — 5 NM radius

Fort Smith — 10 NM radius

Hay River — 10 NM radius

Frobisher — 5 NM radius

Aerodrome Traffic Zones for the additional protection of aircraft operating at an uncontrolled airport were in effect at:

Cambridge Bay — 5 NM radius

Fort Resolution — 5 NM radius

Resolute — 5 NM radius

Uranium City — 5 NM radius

Wrigley — 5 NM radius

Airport Control Towers were in operation at Yellowknife, Inuvik and at Whitehorse.

Scientific rocket firing continued to be accommodated at Churchill, Manitoba and at Cape Parry, NWT.

The Arctic Track System and the Northern Track System along with the domestic high level airway structure continues to provide an improved service to international aviation in the North.

Aviation Safety Bureau

Federal government departments which send their employees to the North on either a temporary or permanent basis are now conducting regular training programs. The emphasis on this training is for survival while lost or involved in an aircraft forced landing or crash. The bureau maintains an advisory service to government departments for these programs. Continued emphasis is being placed on the compliance by commercial operators with Air Navigation Order Series V, No. 12 Sparsely Settled Area, which includes a listing of survival equipment requirements. A Civil Aeronautics Survival and Rescue Sub-Committee has been formed to coordinate various activities within Civil Aeronautics as well as establishing liaison with the Canadian Armed Forces Search and Rescue Organization.

Telecommunications & Electronics Branch

Communications

Review of 1976-77

In support of Northern aviation, communications equipment for aeronautical communication terminals has been installed. These systems are now in use at those Arctic B and C airstrips where training of operating personnel has been completed. Currently operational are:

Whale Cove

Pond Inlet

Grise Fiord

Eskimo Point

Pangnirtung

Cape Dorset

All Aeradio Stations north of 60°N have been modified to provide SSB operation on the HF air-ground frequency 5680 kHz.

Navigational Aid Facilities

Review of 1976-77

VHF/UHF Nav aids — VHF Omni-Range facilities were installed at Fort Good Hope, Coral Harbour, Inuvik, Wrigley and Watson Lake. Five Northern stations have been equipped with VHF/DF systems, Watson Lake, Hay River, Frobisher, Resolute Bay and Churchill. Three DMEs were installed in the North, one each at Wrigley, Fort Good Hope and Hall Beach. Two DMEs are to be installed by the end of March, 1977 at Baker Lake and Coral Harbour.

LF Nav aids — Equipment has been shipped for installation of NDBs at Hall Beach, Whitehorse, Frobisher, and one NDB has been installed at Faro, Y.T.

Omega Monitoring — The operation of four automatic Omega monitoring facilities continues. One monitor installation was removed from Coral Harbour, NWT and relocated at Churchill Manitoba. Preliminary investigations into derivation and propagation corrections through composite processing techniques have begun. At the request of the British Civil Aviation Authority, (National Air Traffic Services) the relative amplitudes of Omega signals from Liberia and Argentina are now being recorded at Frobisher.

A proposal sent to FAA in Washington, suggest a joint study program be initiated to determine optimum Differential Omega correc-

tion techniques for application in Alaska — Yukon areas.

Study on Improved Air Navigation Services in Northern Airspace — A study was conducted to investigate the feasibility for *Improved Air-Ground Communications and Navigational Aids in Canada's Arctic/Remote Northern Airspace*. It would appear that a significant increase in communications and navigational aids coverage for both Low and High Level Airways/Routes as well as in area coverage is technically feasible in Northern Airspace through a program of implementation of remote facilities largely employing satellite rearward circuits for remote operation and control. An effective program for the provision of these services would provide a higher degree of Air Traffic Control efficiency and safety for Northern Airspace. A progressive program over a two or three year implementation period, relying on existing aircraft equipment and ground based facilities, could be contemplated at a capital cost of some \$6 million and an annual operating cost of approximately \$2.75 million. The concept envisages use of off-the-shelf space technology for ground equipment and the consolidation of operating and maintenance staff at a relatively few major locations where economics of scale and logistics presently exist.

Communications Systems

Review 1976-77

During the summer of 1976, a new antenna system was installed at Resolute for reception of the weather maps transmitted from Edmonton. Because of the present dip in the sun spot cycle, lower frequencies are needed at Edmonton to realize the improvements anticipated.

No changes were made on both ADIS and AES teleprinter satellite circuits. The extension of ATC voice circuit 653 has been delayed. AWS teleprinter service at Cambridge Bay, Cape Parry, Hall Beach and Cape Dyer has not yet been automated since the USAF could not provide the model 28 equipment at these locations.

Plans for 1977-78

Frequencies below eight mHz will be commissioned at the facsimile transmitting terminal at Edmonton to improve the quality of maps received at Resolute as well as on the Coast Guard vessels in the Arctic during its summer.

The ATC circuit 653 will most likely be extended to Resolute. The possibility of extend-

ing this same circuit to Fort Chimo and Montreal is also envisaged. The USAF will be able to replace the model 15 with model 28 equipment at Cape Parry Cambridge Bay, Hall Beach and Cape Dyer, thus eliminating the need for a manual relay in Edmonton.

Airports and Construction Services Directorate

Responsibilities

The role of the directorate relates to the provision, maintenance and operation of the National Airports System, and to the planning, design, construction and maintenance of all airport facilities (except non-visual aids, air traffic services and related equipment). Responsibilities involve the establishment of national objectives, plans, priorities, policies and standards, regarding marketing, provision and maintenance of airport facilities, services and operations, for policing and security at airports.

As of May 31, 1976, there were 900 licensed airports/aerodromes in Canada, 105 owned and operated by Transport Canada; another 64 owned by Transport Canada were operated by the provinces, local communities, individuals or organizations on behalf of Transport Canada. The remaining 731 were owned and operated by municipal, provincial, military and other government agencies or private organizations. Within the Yukon and Northwest Territories, TC owned and operated 19 of the 31 aerodromes/airports, qualifying for financial support under the Arctic Transport Policy and program administered by the Arctic Transport Agency; some of the qualifying aerodromes were unlicensed, while some of the others have multiple licenses. For example, Watson Lake, YT, has one conventional land airport, one heliport and three water aerodromes, all licensed. As of March 15, 1977, there were 80 airports/aerodromes, lying north of latitude 60°N, including Quebec, of which 19 were owned and operated by Transport Canada. In respect of Transport Canada airports, the directorate and affiliated regional organizations plan, design and construct airport facilities, manage, operate and maintain plant, equipment and services at various airports. With regard to non-Transport Canada airports, the directorate provides guidance and assistance in the planning, construction and maintenance of facilities, and financial assistance where appropriate.

The Airports and Construction Services Directorate plans and co-ordinates all activities relating to airport operations, levels and stan-

dards, and services and facilities. These include the development of policies and guidelines regarding the operation and security of airports, development of policies and standards for the planning, design, construction and maintenance of airport facilities, provision of financial and advisory assistance to community airports, provision of engineering and architectural support in respect of off-airport CATA installations to other elements of Transport Canada, CIDA, other federal and territorial government organizations. This directorate is also responsible for major construction and for providing design packages for projects undertaken by the regional administrators. Development of training programs, policies and standards in support of the Arctic Transportation Policy, with particular emphasis to the Arctic 'B' and 'C' airports program, for the provision of safe, efficient and most economical utilization of available resources, is carried out in conjunction with other government departments and agencies.

Review of 1976-77

A Memorandum of Understanding (MOU) for the provision of suitable training of northerners for the operation and management of the Arctic 'B' and 'C' airports, is under review by the territorial government, Fisheries and Environment, Indian Affairs and Northern Development and Transport Canada.

The High Arctic Weather Station (HAWS) Aerodromes, Eureka, Mould Bay and Isachsen will become "Public Aerodromes" beginning April 1977, when Transport Canada takes over the responsibility from Environment Canada (AES) for the operation, maintenance and administration of these aerodromes. As a result the facilities at these aerodromes will be improved to meet Transport Canada standards. The total cost of this take-over is estimated at \$437 000. Treasury Board approval has been received for this take-over although no additional man years have been approved.

These aerodromes are to provide enroute NAVAIDS, weather and airground communication facilities to all air traffic within the area. The demand to provide a reasonable level of aeronautical services and facilities has increased due to the increased air traffic and scientific exploratory activities in the area. Therefore, consistent with its primary function, Transport Canada will take over the responsibility for maintaining sites where there are designated "Public Aerodromes". In addition to the initial capital cost of improving the facilities, the operation and maintenance of these aerodromes serving the Canadian Arctic

will cost Transport Canada \$152 000 during 1977-78. Concomitant savings will of course be realized by Environment Canada which will partially offset Transport Canada expenditures.

Resolute Bay Township — The township development at Resolute Bay is well under way, with completion scheduled over a period of three years beginning in 1977, at a total cost of \$11 950 000. Transport Canada has identified the requirement for four married accommodation units at Resolute Bay. It is expected that the GNWT will construct these units and TC will pay the rent — a system similar to that already in effect at other locations in the Arctic.

Quebec Region

Review of 1976-77

Broughton Island — The surveying work for the selection of a new site for the construction of an apron, an air terminal and a vehicle maintenance garage was completed during the summer.

Installation of air/ground communications: this project will be completed early in the summer of 1977.

Cape Dorset — The air terminal and the vehicle maintenance garage were completed in the fall of 1976. The runway (1219 91.44m) has been completed over its entire length and the necessary lighting has been installed. The VHF air/ground communication system has also been installed inside the air terminal. This completes our construction program as such for this village. Maintenance equipment: one snowplough, one wheel-mounted compactor.

Installation of air/ground communications: this project will be completed early in the summer of 1977.

Clyde River — Our survey crew was unable to meet the deadline for completion of the work which had to be done before improvement of the runway by local manpower could proceed. Activities in 1976 were therefore limited to the installation of a wind sock and the supplying of maintenance equipment. Maintenance equipment: one snowblower. Point-to-point communications: this project will be completed early in the summer of 1977.

Frobisher — The contract for repaving the runway, a job which is scheduled to be carried out in 1977, was awarded early in 1976. The vehicles, asphalt plant and various pieces of equipment required to execute the contract

are already at the site. The installation of an RVR was completed in the fall of 1976.

Lake Harbour — The work required to extend the runway is extremely difficult. A large number of rocky protrusions must be levelled by dynamiting. The runway is now 609 m long by 23 m wide. Maintenance equipment: one grader, one wheel-mounted compactor. Installation of air/ground communications: this project will be completed early in the summer of 1977.

Pangnirtung — The air terminal and the vehicle maintenance garage were completed in the fall of 1976. The other projects completed this year are the rotating beacon, the illuminated wind sock and finally the VHF air/ground communication system. This completes our construction program as such for this village. Maintenance equipment: one snowplough.

Installation of air/ground communications: this project will be completed early in the summer of 1977.

Pond Inlet — Department of National Defence personnel were able to complete approximately 762 m of runway before the beginning of winter. The aircraft refuelling systems were installed temporarily pending completion of work on the apron. Maintenance equipment: one snowplough, one snowblower.

Air/ground communications: this project will be completed early in the summer of 1977.

Sanikiluaq — The runway (1219 m 30 m) and the taxiway and apron are 90 per cent completed. The work was done by local manpower using construction equipment belonging to Transport Canada. Maintenance equipment: one snowblower.

General: Except for Clyde River, the Northern Canada Power Commission has completed the construction of power lines connecting the above-mentioned airports to the power sources available in the villages. In the case of Clyde River, the materials are at the site and the work will begin next summer.

Plans for 1977-78

The following work is planned by Transport Canada:

Broughton Island

HF ground/ground communication
VHF air/ground communication
installation of NDB

Cape Dorset

aircraft refuelling system
meteorological services
VHF air/ground communication (permanent installation)

maintenance equipment: one snowblower

Clyde River

improvement of runway by local manpower
installation of lighting system for runway
construction of power line to airport
VHF air/ground communication
maintenance equipment: one snowplough

Frobisher

repaving of runway
exchange of diesel generators
replacement of inside regulators
replacement of various vehicles
lighting for apron and taxiways "C" and "E"
modification of structures housing emergency generators
erection of a fence around the transmitter site
installation of transmitter site VHF omnitest-rehabilitation

Lake Harbour

completion of work on runway pavement
installation of lighting system for runway
construction of air terminal
construction of vehicle maintenance garage
illuminated wind sock
meteorological services
VHF air/ground communication
maintenance equipment: one snowblower, one snowplough

Pangnirtung

meteorological services
VHF air/ground communication (permanent installation)

Pond Inlet

runway extension work by DND
purchase of air terminal to be installed next year
installation of lighting system for runway, provided it is completed before fall
VHF air/ground communication
maintenance equipment: one wheel-mounted compactor

Sanikiluaq

finishing work on runway pavement
installation of lighting system for runway
construction of air terminal
construction of vehicle maintenance garage
maintenance equipment: one snowplough, one grader, one wheel-mounted compactor

Port Burwell

HF ground/ground communication
VHF air/ground communication

Central Region

Review of 1976-77

Relative to the implementation of the Arctic Transportation Policy to upgrade airports and associated facilities, as approved by Cabinet in February 1974, the following is a resume of progress to date.

Site Selection and Design — Site selections have now been completed at all Arctic communities for which Central Region of CATA has been assigned responsibility. Design drawings are also completed for the majority of these airports.

Cape Dorset — Major construction was completed during 1976-77 and the airport turned over to Quebec Region of CATA for programming and installation of associated facilities. *Eskimo Point* — A 1 219 30 m runway is now operational. Passenger Cargo Shelter is in place and operational. Completion of earthwork is scheduled for 1977-78 with runway lighting programmed for 1978-79.

Igloolik — Major construction is deferred to 1979-80. Funds were provided in 1975-76 for upgrading of runway surface using local resources.

Pond Inlet — Construction of runway and associated earthwork is continuing. Completion is expected to continue into 1978-79, at which time the airport will be turned over to Quebec Region of CATA for programming and installation of associated facilities.

Rankin Inlet — Construction of 1524 m 30 m runway and associated taxiway, apron and building areas is completed. The maintenance garage is 70 per cent completed (and is operational). Work has begun on the Passenger Cargo Shelter which will be completed during 1977-78. Upgrading of airfield lighting facilities is programmed for 1978-79.

Strathcona Sound (Nanisivik) — A 1 615 m 30 m temporary runway is operational. Completion of Passenger Cargo Shelter and Maintenance Garage is scheduled for 1977-78. Further runway construction is required in 1977-78 with final trimming in 1978. Runway lighting c/w rotating beacon, RILS, VASIS and one approach lighting system were temporarily installed during 1976. The runway will be extended to 1 951 m in 1977-78.

Baker Lake — Storage garage for airfield maintenance equipment is 80 per cent completed.

Grise Fiord — During 1976-77 an airfield lighting package, complete with lead-in approach lighting and hazard beacons, was installed. Upgrading of runway surface will be

undertaken through 1977-78 — 1979-80 using local resources.

Hall Beach — POL Facilities were completed with the installation of one (1) additional 90 922 l tank. A storage garage for the fuel tender was also completed during 1976-77. **Resolute Bay** — The upgrading of POL facility in compliance with environmental requirements was completed during 1976-77. The POL distribution system was also refurbished.

During the past year and in concert with representatives of the Government of the Northwest Territories, a number of site visits and community workshops, involving all Arctic communities which fall under the scope of the Arctic Transportation Policy within Central Region (CATA), have been conducted. These meetings have proven most beneficial in terms of promoting an understanding and acceptance of the overall program.

Additionally, during November-December of 1976, a tri-regional training course was conducted at Coral Harbour, NWT. The purpose of this course was to train airport maintainers and Communications/Weather reporting personnel who would undertake these functions at airports which have reached this stage of development. Number of personnel, from the Central Arctic, trained:
Eskimo Point — one airport maintainer, one communicator
Grise Fiord — one communicator
Rankin Inlet — two maintainers
Whale Cove — one maintainer, one communicator

A second training course for Airport Maintenance personnel is tentatively scheduled during May of 1977. Courses for communications/weather reporting personnel are scheduled for the fall of 1977.

Major construction proposed during 1977-78 — Further to the continuing activities noted above, the following is a listing of new activities to begin during 1977-78:

Chesterfield Inlet — Realign and upgrade existing runway to 914 m 30 m. Construction and provision of associated facilities to continue during 1978-79 — 1980-81.

Repulse Bay — Realign and upgrade existing runway to 914m 30 m. Construction and provision of associated facilities to continue during 1978-79 — 1979-80.

Spence Bay — Construct new runway to 914 m 30 m. Construction and provision of associated facilities to continue during 1978-79 — 1979-80. Construction will be carried out by DND. This is the last of the six airports under the old agreement.

Grise Fiord — As noted previously, the up-

grading of the existing runway (610 m 30 m) will commence during 1977-78 using local resources. Continuing construction and provision of associated facilities will continue through 1978-79 — 1979-80.

Whale Cove — Runway upgrading. Equipment from Eskimo Point will be shipped to Whale Cove in 1977-78 to commence work in 1978-79.

DND Participation in Arctic Program

The new Memorandum of Understanding between Transport Canada and DND for continued participation by DND in the construction of Arctic Airports was signed by the respective DM's on June 1, 1976.

Telecommunications & Electronics Activities

Communications

Unicom communications packages were installed at Gjoa Haven, Grise Fiord and Strathcona Sound, adding to those previously installed at Eskimo Point, Whale Cove and Repulse Bay. To date, attendants have been trained at Eskimo Point, Whale Cove and Grise Fiord. The facility at Strathcona Sound is being operated by Nanisivik Mines. HF Communication facilities were installed in conjunction with the unicom at Repulse Bay, Strathcona Sound and Whale Cove.

Nav aids

DME was added to the existing VOR facilities at Coral Harbour, Baker Lake and Hall Beach.

The NDB at Hall Beach was replaced and relocated with commissioning expected in 1977-78.

The NDBs at Gjoa Haven and Arctic Bay were relocated at the request of GNWT.

A VHF/DF facility was installed at Resolute Bay.

Omega Monitoring

Automatic monitoring facilities were relocated from Coral Harbour to Churchill.

Resolute Bay Tacan

The military TACAN was decommissioned in May, 1976, and equipment removed by DND in August, 1976.

Resolute Bay Facsimile

The new loop antenna installed during the summer of 1976 has proven unsatisfactory. Further investigation regarding this circuit will

take place with user agencies early in 1977-78.

Western Region

Air Traffic Services

The Air Traffic Services Branch continued to provide routine services to northern airspace. In anticipation of future requirements, the planning and programming of a number of capital projects was completed.

Operational planning for a stand-alone SSR system at Yellowknife has been initiated in accordance with the national strategic plan for enroute radar coverage. This is also supported by NASPW and the Mackenzie Aviation System Area Master Plan study (macplan).

Programming for an ATC hotline from the Edmonton ACC to the proposed airport control tower at Resolute has been completed. Latest schedules call for construction of the tower during 1979-80.

Plans for the new area control centre located in Edmonton were finalized during 1976-77 and construction will begin in 1977-78. Air Traffic service for all Arctic and northern control area airspace within the Edmonton FIR is provided from this facility. Design considerations provide for expansion due to growth to the year 1992.

Civil Aviation

In accordance with their responsibilities and delegated authority Regional Civil Aviation Inspectors conducted monthly surveillance flights, completed 30 base inspections and concluded five court cases. In addition, approximately 30 written examinations were completed at the Yellowknife office.

All electronic and visual aids to air navigation were flight checked on a routine basis. Enroute navigation and communication facilities were periodically flight checked and monitored. All services provided in support of aircraft operation were monitored and 24 airport inspections were carried out.

In keeping with the CATA goal to promote Aviation Safety within the industry, an Aviation Safety Officer was appointed in 1976. This officer's duties include working with commercial aircraft operators to develop safety programs within their organizations.

Telecommunications and Electronics

Review of 1976-77

Aeradio Operations

The operational training package for Arctic Facility Airports was completed by Western Regional Telecom. Training of staff hired by the territorial governments will commence in 1977-78, with Faro, YT being the first site under this program. Procedure manuals for Arctic Airports operation also were completed in 1976-77.

A training course for aeradio operators on the VHF/DF system was developed, and training of station staff at Watson Lake and Hay River will be carried out in the near future. Commissioning of the VHF/DF installation at these locations is expected by mid-may, 1977.

The Dawson City, YT Aeradio Station was relocated from its town site to a new facility at the Dawson City Airport. This location provides greater accessibility to the station by aviation operators, which in turn has improved the level of service provided by the station. A remote VHF communications facility was established on the top of King Solomon Dome, near Dawson City which significantly improves the VHF radio coverage of the Dawson City Aeradio.

Navigational Aids

The Fort Good Hope VOR/DME was commissioned on February 24, 1977.

The standard VOR at Inuvik has been replaced by a Doppler system to overcome siting problems. This facility is expected to be commissioned by the spring of 1977.

Flight checking has been carried out for the Doppler VOR at Watson Lake. It is expected that this installation will be commissioned in the spring of 1977.

Radio range installations at Burwash and Teslin in the Yukon were converted to non-directional beacons in 1976.

Plans for 1977-78

The following projects are planned for completion and commissioning in 1977-1978:

Hay River-VOR/DME

Wrigley-VOR/DME

Watson Lake-Radio Range Conversion to NDB

Communications facilities at Faro Airport
Communications facilities at Fort McPherson Airport

Norman Wells-VHF/DF

Fort Simpson-VHF/DF

Relocation of the Coppermine Aeradio from its present location in the community to a new passenger/cargo building at the Coppermine Airstrip.

Airports and Construction

Mainline airports (Transport operated)

The following development projects were carried out at the northern mainline airports during 1976-77.

Yellowknife - A paved overlay was put on Runway 08/26; a new taxiway was constructed into the commercial development area, and access roads to tenant leases were improved.

Inuvik - The landfill project was continued.

Ft. Simpson - The runway 12-30 was hard-surfaced, a project which was begun in the previous year.

Cambridge Bay - The runway was upgraded with an overlay of screened gravel.

Whitehorse - Renovations were carried out to the Air Terminal Building which will increase the space available for passenger processing.

Arctic Air Facilities Program

Airport master plans were completed for the following locations:

In the Yukon:

Dawson City

Faro

Mayo

In the NWT:

Aklavik

Ft. Good Hope

Holman

Tuktoyaktuk

Airport site selections were completed for:

Ft. Good Hope

Holman

Airport construction during 1976-77 consisted of the following projects:

Dawson City

improve graded areas and approaches
gravel overlay on runway 02/20
construction of apron and aircraft parking area

taxiway improvements

provision and installation of an aviation fuel dispensing unit

installation of A/VASIS.

Faro

lower a hill to improve approach zoning

runway 27

widen and gravel runway 09/27

construction of apron and aircraft parking areas

provision and installation of a passenger/cargo shelter

installation of runway lights (for use in cases of emergency only)

installation of NDB

provision of commercial power to the airport.

Mayo

reroute highway to allow full length use of runway 06/24

provision and installation of an aviation fuel dispensing unit.

Old Crow - Logs were harvested in sufficient quantity to construct a passenger/cargo shelter during the 1977 season. The project is being supervised by the Yukon Territorial Government, with local native residents doing the labour.

Aklavik - The construction of a Category 'C' airport was begun in June, 1976.

Ft. McPherson - The construction of the airport to Category 'C' standard was continued. This project is carried out by a private contractor using Transport-funded equipment.

In addition the following was conducted:
provision and installation of a passenger/cargo shelter

installation of permanent runway lights

provision and installation of standby power
provision of an aviation fuel dispensing unit

Coppermine

provision of a full set of visual aids;
gravel haul and stockpile was commenced

during early March, 1977;

commercial power was installed to the airport early in 1977.

Equipment Purchase

A full set of heavy construction equipment was purchased and shipped to Holman, NWT where it will be used to construct a new airport and access road. It is intended that a private contractor will operate the equipment under Transport supervision.

A gravel crushing unit complete with three haul trucks was purchased and shipped to Coppermine where it is planned to be used during the 1977 construction season. Three snow-blowers were purchased and shipped, one each to Dawson and Mayo, Yukon and Ft. McPherson, N.W.T.

Training

A pilot native training course was held at Coral Harbour, NWT, October - December, 1976 where residents of nine eastern Arctic communities were trained in airport related subjects. Nine students, (all Inuit) were



The expansion of air services in the Arctic has brought with it many modern airports and other aviation facilities.

trained in airport maintenance and operation, and six students (four Inuit) were trained in weather observation/radio communications.

Plans for 1977-78

During the 1977-78 it is proposed to carry out the following projects:
Complete airport master plans for:

Yukon:

Beaver Creek
Haines Junction
Old Crow

Ross River
Teslin

NWT:
Ft. Franklin
Ft. McPherson
Lac La Martre
Paulatuk
Sachs Harbour

Site selections for airports and related facilities will be carried out for:
Ft. Norman

Ft. Franklin
Lac La Martre

The following projects are scheduled for 1977-78:

Ross River - Provision and installation of an aviation fuel dispensing unit.
Faro - Provision of a standby power unit.
Aklavik - Continue with the construction of the Aklavik airport.
Ft. McPherson - The Ft. McPherson Airport Construction Project is scheduled to be com-

pleted by the end of the 1977 construction season.

Coppermine - The gravel which is presently being stockpiled will be crushed and spread on the strip during the 1977 construction season.

A passenger/cargo shelter complete with full Transport Aeradio facilities will be installed at the airport. (presently, Aeradio operate from within the townsite)

The taxiway, ramp, aircraft parking apron and a small commercial development area will be completed.

Holman - The construction of an airport will commence with the 1977 construction season, using the Transport Canada equipment now on location. Electricity will be provided at the site.

The following projects have also been identified but are not presently in the delegated program:

Mayo - complete taxiway, ramp and aircraft parking apron; and install an addition to the existing operations building to convert this structure to an air terminal building with passenger/airline facilities; gravel overlay to runway 06/24

Old Crow - proceed with construction of a passenger/cargo shelter, using local labour and logs harvested during the 1976-77 winter; and install an aviation fuel dispensing unit.

Training

On-site training of weather observers/radio communicators is scheduled to be carried out at Faro beginning early in the new year.

Other training is presently being scheduled for McKenzie Delta locations.

A second airport maintenance course is scheduled to be carried out at Coral Harbour May 1-15, and will include students from six Eastern Arctic communities.

Canadian Marine Transportation Administration (CMTA)

In August 1975, the Marine Services component of the Canadian Marine Transportation Administration was renamed the Canadian Coast Guard, a term intended to describe more clearly the activities and purpose of the largest component of CMTA. The Canadian Coast Guard embraces seven branches at Transport Canada headquarters in Ottawa, with field operations the responsibility of five regional directors.

Canadian Coast Guard

Responsibilities

To carry out and co-ordinate the delivery of cargo and passengers for the Canadian government, USAF and Canadian commercial interests; to provide ice and routing information and, when necessary, to provide icebreaker support for vessels of all kinds, including drilling rigs navigating Arctic waters and Hudson Bay; to carry out environmental research and surveys as requested by other government agencies; to install, operate and maintain marine aids to navigation; to carry out marine search and rescue operations; to administer the Navigable Waters Protection and Arctic Waters Pollution Prevention Acts.

Review of 1976-77

Ten Canadian Coast Guard radio stations in the Arctic and Hudson Bay provided a marine communication Safety and Public Correspondence service to ships in northern waters, while four of the stations provided a marine telephone service. A family of high frequency radio-telephony single sideband continues to provide wide-area ship/shore radiotelephone communication coverage from Frobisher.

During the 1976 Arctic resupply operation, delivery of dry cargo was on a weight/measurement basis and delivery of bulk petroleum products was made by four tankers on Time Charter. A fifth tanker was chartered to transport bunker fuel to the Canadian Coast Guard ice-breakers in the High Arctic.

In addition to the Canadian Coast Guard ships, 16 commercial vessels were engaged and approximately 50 northern settlements were served by these vessels. Approximately 590 200 t of cargo was delivered, of which 75 per cent was bulk petroleum products and the remaining 25 per cent dry cargo.

During the 1976 navigation season, Transport Canada deployed six heavy and three medium icebreakers to provide assistance to commercial ships operating in Arctic waters. In addition, one northern supply vessel was seconded for Arctic operations.

CCGS Narwhal was engaged in a multi-disciplinary survey of Hudson Bay. This survey was a continuation of the program undertaken by the *CCGS Narwhal* in 1975. It is part of a long-range objective to provide a bank of information beneficial to the navigator, the scientist, the ecologist and the natural resources explorer. The program involved bathymetric, gravity, tidal current, oceanographic and biological data of Hudson Bay.

CCGS Labrador was engaged in a major hydrographic operation in the Eastern Arctic. This program was a continuation of the survey along the coast of Bathurst Island toward Cameron Island. This area is considered to have the highest charting priority in the Eastern Arctic because of the hydrocarbon discoveries on Cameron Island.

CCGS Louis S. St. Laurent provided escort for a drilling vessel *Canmar Explorer II* from Lancaster Sound in the Eastern Arctic, through the Northwest Passage to the waters of the Beaufort Sea. If we exclude the *Manhattan* voyage, this escort was probably the first commercial operation to utilize the Northwest Passage as a navigable waterway.

Because of ice damage sustained to **CCGS Camseal** during the 1975 navigation season in the Western Arctic, it was necessary to sail **CCGS J.E. Bernier** from Quebec City to support the Beaufort Sea operations. The **CCGS J.E. Bernier** departed Quebec during mid-May and proceeded to the Western Arctic via the Panama Canal. On arrival in the Beaufort Sea, the **CCGS J.E. Bernier** commenced escort activities in conjunction with the operations of the Northern Transportation Company Limited. The vessel's program was a mix of duties comprised of ice escort, buoy laying, transponder beacon erection and some hydrographic work. The vessel completed operations during late September and returned to Quebec via the Northwest Passage, thus circumnavigating North America in one season.

Although the primary function of the Canadian Coast Guard icebreaking fleet was to ensure that icebreaker support was available to marine interests, **CCGS Louis S. St. Laurent**, **CCGS John A. MacDonald**, **CCGS d'Iberville**, **CCGS Labrador** and **CCGS Norman McLeod Rogers** were, on an opportunity basis, engaged in hydrographic surveys as a supplement to the primary assignment.

Waterways development in conjunction with Arctic Transportation Agency is directing a two-year study on the environmental impact of the proposed major Mackenzie River dredging project. Information on marine transportation in the Mackenzie Basin was collected and supplied to the Mackenzie Basin Inter-Governmental Liaison Committee.

A study of ice impact forces on ships' hulls is continuing; it is expected that valuable information will be derived for the future design and specifications of vessels travelling in the North.

A hydraulics model study for offshore terminals to be used by very large vessels is



Oil companies working in the Arctic need the help of Transport Canada's Canadian Coast Guard icebreakers.

being carried out in Transport Canada's Hydraulic Research Centre.

Plans for 1977-78

It is planned to upgrade the Killinek Coast Guard radio station at Port Burwell during 1977-78. The establishment of a peripheral station at Cape Dorset, controlled from Coral Harbour via ANIK-derived circuits will improve radio communication coverage in the HF band in Hudson Strait and Fox Basin.

Research and Development Centre

Responsibilities

The Research and Development Centre, formerly the Transportation Development Agency, was designated as a focal point for transportation research and development in Canada 'to encourage and promote continuous improvement, innovation, growth or phase out of modal and intermodal transportation'.

Review of 1976-77

Transportation of Oil & Gas from the Arctic Islands

The transportation costing model derived during the study of Transportation of Oil and Gas from the Arctic Islands (1974-75) was up-

dated with the latest available data and used to obtain approximate costs of oil shipments from Cameron Island. Since then, a study by the Strategic Studies branch on marine shipments of oil and LNG has been launched, with active participation by technology.

Assess Y-Pass Ship Propulsion System

This project is related to defining a protected propulsive and steering system for ships navigating in ice infested water.

A model is being built by NRC for testing, both by NRC in free water and by Arctic Canada Ltd. in artificial ice.

CCGS Wolfe Icebreaker Bow Evaluation

A report has been issued on the full-scale trials held in February and March 1976 to evaluate a new low-angle bow fitted on the CCGS Wolfe. Results showed a slight improvement over the old bow form, but also that the new bow form is detrimentally effected by snow cover. A second phase trial is underway to investigate the snow effect.

MV Arctic Scientific Evaluation Program

A three-part instrumentation and evaluation program, funded by TDC, was developed jointly by TDC and CMTA, with a view to fully exploiting the potential for gaining experience in ship design and commercial Arctic operations. The instrumentation part of the program is currently being contracted through DSS.

Processing Ice Data - Arctic Ice Atlas

Ice data for representative target areas has been accumulated for 10 years in a raw form that requires manual processing and computer manipulation to provide ice data for use in compilation of a Canadian Arctic Ice Atlas. The project is managed by the Atmospheric Environment Service of DFE; basic data processing was completed in 1976 and the preparation of text, maps, etc. of the atlas will be done in 1977.

ACV Icebreaking Bow Development Program

Phase II and III of the ACV Icebreaking Bow Development Program were combined into a final testing phase during the winter of 1976-77. Tests were planned for the air cushion platform to be attached to an ice-strengthened commercial ship Imperial St. Clair and also to a commercial tug Thunder Cape, with evaluations and assessments to follow. Additional testing with the icebreaker Alexander Henry was also planned. In spite of several program setbacks, these trials have confirmed



CCGS *Louis S. St. Laurent* escorted the drilling vessel *Canmar Explorer II* through the Northwest Passage.

viability of the ACV *Iceater-I* attached to the three vessels and indicates for each increased vessel performance in an icebreaking capacity.

Plans for 1977-78

Transportation of Oil and Gas from the Arctic Islands

This marine study will continue into 1977-78 and it is expected that minor studies will be initiated, relating to this as a 'second opinion' on some of the technical aspects.

Assess Y-Pass Ship Propulsion System
 Tests are to be completed and an analysis made of the positive aspects of this propulsive and steering system for ice-infested water. The analysis should provide guidelines for future development of protected propulsive system.

CCGS Wolfe Icebreaker Bow Evaluation
 The second phase tests will be completed early this year. They should determine correlation between snow cover and the 'lumped' friction coefficient for this new low angle bow shape.

Parametric Study of Icebreaker Bow Shapes
 A parametric study will be made of various icebreaking bow shapes and correlated with model tests. This should identify the critical shape factors for those icebreaker hull shapes for which model test data have been published.

MV Arctic Scientific Evaluation Program
 Progress will continue on the MV Arctic program to define more fully the second part of the program, which will provide for the collection of data and operational evaluations over an initial five-year period; 1977-78 may also

see the beginning of development and testing of new instrumentation for ship and Arctic marine environmental sensing and evaluation, which is the third part of the program.

Study of Ice Forces on Circular and Conical Structures

TDC,DSS and the Coast Guard are jointly funding a program which is a study of ice forces on circular and conical structures. This project, to be completed in 1977, will develop analytical methods for the prediction of the forces which inland water ice sheets can exert on bottom founded off-shore structures of cylindrical or conical shape. Significant savings in the cost of off-shore structures are expected as a result of this study.

ACV Icebreaking Bow Development Program

Full-scale trials of an air cushion bow platform/vessel combination will continue into the spring of 1977, with both technical and economic analyses to be detailed. A consolidated final report containing results of the two-year program will eventually be issued by TDC, upon completion of the project at the end of the testing this year.

Unemployment Insurance Commission (UIC)

Responsibilities

The mandate of the UIC includes accepting and processing claims from residents of northern Canada, and the payment of benefits to those who qualify.

In 1977, the hearing of appeals of Board of Referees will be held in the Yukon district office in Whitehorse, instead of Prince George, B.C.

The Edmonton Office serves the district of MacKenzie and Franklin, excluding Baffin Island. The district offices in Winnipeg and Montreal East serve the districts of Keewatin and Baffin Island respectively.

Review of 1976-77

The number of claims received increased from 6625 to 6735 (1.7%) in 1976. The existing offices provided speedy and personalized service to the people of their communities.

Yukon Territory

The Whitehorse Office retains claimants' files for easy reference and prompt adjudication, and provides information to claimants on their rights and obligations. Staff includes, an officer-in-charge, three insurance agents and two clerks. Supplementary personnel is added at times of heavy claim-load. During 1976, the office processed 4 563 claims.

The Whitehorse UIC office was recently relocated in the Federal Building, the home of the CMC office; part of a move to integrate the Unemployment Insurance Commission and the Department of Manpower and Immigration. The close teamwork of these two offices provides a unified service to claimants and clients to assist them in finding work as soon as possible.

The UIC has representatives on the joint federal and territorial government Manpower Needs Committee, which evaluates training and manpower requirements for the area.

The population of the Yukon is approximately 22 000 with a labour force of 8 155.

District of Mackenzie

This district is served by an inquiries office in Yellowknife and by UIC-trained Canada Manpower clerks in Inuvik, Hay River, Fort Smith and Fort Simpson. The Edmonton district office which is responsible for this part of Canada, has identified all the claims from these areas in one special service unit in 1976. In that year, 2 113 claims from the Northwest Territories were processed by the Edmonton UIC office.

The District of Mackenzie has a population of 23 657 and a labour force of 8 200.

District of Keewatin

All claims originating from the District of Keewatin are dealt with by one service unit in Winnipeg. UIC Personnel have familiarized themselves with the problems of communication in northern areas. Necessary liaison with area social workers is carried on by phone and by mail.

In 1976, 214 claims from the Northwest Territories were processed by the Winnipeg UIC office. The District of Keewatin has a labour force of 710 and a population of 3 403.

District of Franklin — Baffin Island

The officer responsible for UIC in Frobisher on Baffin Island gives guidance to claimants completing applications for benefit. Baffin Island is part of the District of Franklin and is administered, for unemployment insurance purposes, from the Commission's Montreal South East office.

The District of Franklin has a population of 7 747 and a labour force of 2 040. During 1976, there were 543 claims processed for this area.

Plans for 1977-78

If Bill C-27, before Parliament in Spring 1977 is enacted, the creation of the Canadian Employment and Immigration Commission will establish one-stop service for claimants. This will give the claimant the total service presently supplied by both the Unemployment Insurance Commission and the Department of Manpower and Immigration.

Government of
the Northwest
Territories

Government of the Northwest Territories (GNWT)

Responsibilities

To exercise government jurisdiction within the Northwest Territories, exclusive of control over natural resources (except game, which is a territorial resource).

Council of the Northwest Territories

Two by-elections were held during 1976-77. Council sessions were held in January/February, May and October. The first two sessions were held in Yellowknife while the fall session, following an established custom, was convened outside Yellowknife, on this occasion at Rankin Inlet.

58th Session

The 58th Session of Council, convened on January 26, 1976, Commissioner Hodgson invited Council to consider giving more authority to local government levels, specifically town, village, hamlet and settlement councils.

The main financial estimate for 1976-77 in the amount of \$203 455 300 was approved. Supplementary estimates for 1975-76, providing \$5 710 000 for unanticipated expenditures, were also approved.

A Financial Agreement Ordinance was passed to provide the Northwest Territories with operating and capital grants from the federal government.

Council also enacted a Supplementary Financial Agreement Ordinance respecting a supplementary operating grant of \$4 000 000 for 1975-76.

The Commissioner was authorized to borrow funds from the Government of Canada to make loans to municipalities and to individuals in 1976-77 by enactment of a Loan Authorization Ordinance.

The Northwest Territories Housing Corporation Loan Ordinance was passed to make funds available for housing programs under the National Housing Act.

Council enacted the Strathcona Sound Development Loan Agreement a town centre development at Strathcona Sound.

Amendments to the Council Ordinance were enacted to provide for annual increases in the indemnities and allowance paid to Members of Council.

Council enacted the Emergency Medical Aid Ordinance to protect persons who render

emergency medical aid or first-aid treatment to accident victims.

The Justices of the Peace Ordinance was amended to allow the Commissioner to appoint non-residents as Justices of the Peace with power to act in specified areas in the territories.

Minor amendments were also made to the Survivorship Ordinance, the Trustee Ordinance and the Co-operative Associations Ordinance.

The Honourable Judd Buchanan, former Minister of Indian Affairs and Northern Affairs, in an address to Council on the closing day of the session, called for more progress on land claims negotiations.

59th Session

In his opening address on May 17th, 1976, Commissioner Hodgson stated that the federal government had agreed to the provision of funds to hire the necessary staff to assist members in preparing a response to the Inuit Tapiriyat land claim proposal "Nunavut". The Commissioner also suggested that Council present its views to the Mackenzie Valley Pipeline Inquiry as these two matters were of major concern to the people of the Northwest Territories.

Council enacted a revised Legal Profession Ordinance to grant legislative sanction to the Northwest Territories Bar Association and to allow that association to govern its own affairs, including registration and discipline of its members.

Amendments to the Territorial Hospital Insurance Services Ordinance deleted the provision for the collection of co-insurance charges. The number of members on the Territorial Hospital Insurance Services Board was also increased from three to five.

The Labour Standards Ordinance was updated to bring its provisions into line with comparable labour legislation in effect elsewhere and to provide for an orderly method of collecting unpaid wages.

Various amendments were made to the Wages Recovery Ordinance to bring its provisions into line with current wage rates.

An Interprovincial Subpoenas Ordinance was passed to provide for reciprocal arrangements with other jurisdictions concerning enforcement of subpoenas.

The Criminal Injuries Compensation Ordinance was amended to bring its provisions into line with the federal-territorial cost shar-

ing agreement whereby 75 per cent of the cost of the program is absorbed by the federal government.

In response to requests from the Northwest Territories Association of Municipalities a number of minor amendments were made to the Municipal Ordinance.

The Liquor Ordinance was amended to ensure the validity and enforceability of local liquor restriction plebiscites and regulations. The amendments also provided for optional prohibition in addition to restriction.

Supplementary estimates were passed to provide \$9 397 800 to meet additional expenditures for the public service of the Northwest Territories for the rest of 1976-77.

The Inuit Tapiriyat of Canada's land claim proposal was considered by Council in Committee of the Whole. The President and land claims director, of the Inuit Tapiriyat of Canada attended Council during this discussion to assist members in their deliberations.

In conjunction with the land claim proposal, Council considered a detailed analysis of the proposal prepared by Dr. Norman Ward, dealing primarily with its political aspects. A committee was formed to prepare a position paper for submission to Council. Territorial Council presented their positions on the proposed Mackenzie Valley Pipeline to the Berger Inquiry.

60th Session

On October 18, 1976, Council convened in the Maani Ulujuk School in Rankin Inlet for the 60th Session.

Commissioner Hodgson in his opening address to Council announced the administration's decision to decentralize authority within the territorial government to regional directors. Decentralization would result in a speedier and more flexible decision making process with recognition of the needs of communities and the different characteristics of the various areas of the Northwest Territories.

The Honourable Warren Allmand, P.C., M.P., newly appointed Minister of Indian and Northern Affairs, addressed the Council on opening day. He stressed his belief in direct contact with Northern people and situations and said that he was pleased by the ever increasing extent of native participation in all levels of government in the North. He also announced that he had authorized Commissioner Hodgson to proceed immediately, in

consultation with Council, with the appointment of a third elected member to the Executive Committee.

In response to a motion in this regard, Commissioner Hodgson announced on October 22, that Dave Nickerson, Member for Yellowknife North, would take over the portfolio of Social Development. This resulted in the first "cabinet shuffle" for the Northwest Territories as Peter Ernerk moved from the Department of Social Development to become Minister of Economic Development and Tourism.

Much time was devoted to discussion of the proposed new Education Ordinance, and it was eventually resolved to defer consideration of the Bill to January 1977 when the 60th Session would reconvene in Yellowknife two days prior to the opening of the 61st Session.

A revised Teachers' Association Ordinance was enacted to extend self-government and self-regulatory powers to the NWT Teachers' Association.

The Territorial Hospital Insurance Services Ordinance was amended to provide for the appointment of boards of management to manage and operate health facilities funded by the Government of the Northwest Territories and for the appointment of a Public Administrator where it is considered to be in the public interest.

Council enacted the revised Apprentices' and Tradesmen's Ordinance to provide for the certification of persons in designated trades and to set out guidelines respecting contracts of apprenticeship.

Funding to meet additional operational expenses for the Government of the Northwest Territories during 1976-77 was approved by passage of the Supplementary Appropriations Ordinance 2 of 1976-77.

Council resolved that a review of the future social, economic and political development of the Northwest Territories be undertaken by Council and that approval in principle be requested for sufficient funding to carry out the necessary research and to seek independent advice and information. A Committee of Council was formed to provide recommendations and direction.

Science Advisory Board

The Northwest Territories Science Advisory Board was established in 1976 in response to a private member's bill. The Board is to ad-

vise the Territorial Council on technical, engineering and scientific matters.

Dr. O.M. Solandt, a highly esteemed scientist, was appointed Chairman of the Board. He has extensive experience in the sciences, in government and private industry. The Board, in addition to the Chairman, has nine members of whom five are from the Northwest Territories and three from southern Canada. All have extensive experience in the Northwest Territories.

Clerk of the Council

The provision of all administrative and support services to Council is the principal function of the Clerk of the Council's office. Professional advice on procedural matters is provided by the Clerk of the Council and the Clerk Assistant to the Speaker, to Members and to the Executive. Similar services are provided to Standing and Special Committees of Council, which meet during and between Sessions.

During Council Sessions services provided include the recording, editing, printing and distribution of the official record of the proceedings of Council, as well as the production and distribution of documents considered by Council.

The Clerk of the Council's office maintains liaison with the Chief Electoral Officer of Canada under whose jurisdiction territorial elections are conducted. Negotiations are at present underway to eliminate some of the difficulties encountered in previous elections.

The office of the Clerk of the Council in cooperation with the Department of Information provides simultaneous translation services during council sessions as well as translation of documents into Eastern Arctic Eskimo. The provision of these services has progressed so that the purchase of highly specialized translation equipment has become necessary.

Department of Economic Development and Tourism

This department's new name and structure is the result of a five-month review and receipt of executive approval for re-organization and re-alignment of responsibilities.

Responsibility and accountability for the delivery of all on-going programs, except marketing, will be vested in the regional superin-

tendents. Program management, policy, planning and monitoring; as well as marketing and bulk purchasing; will be the responsibility of headquarters divisions.

Projects and Marketing Division

This division is concerned with all aspects of government operated projects; responsible for project operations, arts and crafts development and marketing. A co-ordinated service is provided to develop these operations into viable businesses for eventual turn-over to private enterprise or co-operatives. A marketing service is also offered to the business community for products produced within the Northwest Territories.

Project Operations

A significant highlight of the year was the establishment of a furniture plant at Hay River, employing 14 territorial residents with expansion under consideration. The operation has successfully demonstrated the use of locally produced lumber in the manufacture of upholstered furniture. The furniture is of modular design, easily assembled, enabling substantial savings in transportation costs.

Commercial fisheries, fish processing plants, the production of Indian and Eskimo handicrafts, canvas product manufacturing and sewing projects created employment and income opportunities in many of the smaller communities. Retail stores in Nahanni Butte, Rae Lakes and Bay Chimo, and a laundry at Frobisher provide these communities with essential supplies and services. These operations have Inuit or Indian managers, with managerial advice and guidance provided, as may be necessary, by the operations section.

The production of distinctive northern design parkas at plants located in Inuvik, Baker Lake and Frobisher has increased, but demand still exceeds production capabilities. It is estimated that total production and sale of this product will exceed 10 000 units during the 1976-77 season.

The production of northern designed, hand-crafted jewellery in Frobisher has been moderately successful with an increasing demand for these products. The Frobisher Knitwear project has continued to provide the market with high quality sweaters.

Further steps were taken in the development of greenhouses, utilizing waste heat from power plants, with the construction and



Furniture making at Hay River. Local lumber is used in the construction of upholstered furniture.

operation of greenhouses at Frobisher and Sanikiluaq.

Marketing

The marketing section displayed northern manufactured products at four national shows and six mini-gift shows during the year. Two shows in Toronto resulted in orders averaging \$65 000 per show, while the two Vancouver shows averaged \$45 000 each.

Popular items are northern designed duffle parkas produced in Inuvik, Frobisher and Spence Bay. Between 100 and 150 fur parkas, produced in Tuktoyaktuk and Aklavik fur

garment shops are sold each year through the marketing service.

A Yellowknife Distribution Centre was established to centralize the marketing function and more efficiently market the various products.

Arts & Crafts

The Paulatuk Sewing Project held a seven-month training session featuring sealskin inlay tapestries and sealskin products. The prototypes received during the training period had immediate market acceptance. The project went on production in the first of October. In September, the Fort Liard Craft Shop

opened under government auspices. This project has received considerable assistance over the past two years. The shop will feature birch-bark items as well as a traditional line of crafts.

A program to up-grade jewellery design and production and to start a sewing program was initiated in Pelly Bay in a building renovated for the purpose by the Pelly Bay Co-operative.

The Chesterfield Inlet Craft Shop officially opened on September 15. During the first few months, skills upgrading in sewing and carving have been featured.

The Arts and Crafts Section organized and managed the Northwest Territories visual and

performing arts contributions to the Olympics in Montreal. In addition, materials and advice were provided to the Ontario Science Centre for their large Arctic displays and demonstrations.

The Pangnirtung Weaving Shop was reorganized, increasing the number of trained weavers from five to 11. New tapestries are being produced with a more sculptural aesthetic appearance.

Business Services and Tourism Division

This division combines services and expertise required by the business community and the travel industry in the development of their enterprises.

Financial Assistance Section

The Financial Assistance Section administers two direct loan funds — the Eskimo Loan Fund and the Small Business Loan Fund; one guaranteed loan fund — Great Slave Lake Fishermen's Loan Fund; and also plays a support role in the Eskimo Economic Development Guaranteed Loan program introduced during the year. A support role is also played in the processing of loan applications to the Indian Economic Development Fund.

During the year 65 applications totalling \$1 085 000 were reviewed by the Eskimo Loan Fund with 46 loans valued at \$850 000 being approved. Forty-four applications requesting \$1 245 000 were received by the Small Business Loan Fund Board with 16 loans valued at \$387 000 being approved. Eighteen applications totalling \$91 130 were reviewed by the Fishermen's Loan Board with 15 loans valued at \$66 630 being approved.

Co-operative Development

During the past year there were 42 active co-operatives in the NWT. The associations have a membership in excess of 2 700, and employ 557 individuals on a full-and part-time basis, contributing \$1 820 000 to the economy of the territories. During the past year, new standard bylaws governing all co-operatives were declared in force, published and distributed.

Thirty-seven co-operatives now hold membership in the Canadian Arctic Co-operative Federation Limited. The Federation has improved service to its member co-operatives. The Government of the NWT continued

to assist with the funding of the federation by the provision of a \$75 000 operating grant.

Four credit unions have a combined membership of 1 444 with total assets in excess of \$3 000 000.

Travel Industry

The general trend has been toward a growing number of tourists spending an increasing amount of money in the NWT. However, the volume of visitors did stall in 1974 and the subsequent recovery in 1975 only reached 21 000.

Total expenditures on the other hand have followed a steady upward trend, increasing from \$6.75 million in 1974 to \$10.80 million in 1975. The increase was due in part to an increase of 2 000 tourists between 1974 and 1975, and in part to the inflationary pressures in the economy. It is estimated that nearly 12 000 of the 21 000 tourists visiting the Northwest Territories in 1975 arrived by road, the balance by air. Preliminary evidence indicates a slight increase in tourist activity for 1976.

New sport fishing lodge ventures include a six guest tent camp at the Hornaday River, owned by the Paulatuk Hunters and Trappers Association. Arctic Star Lodge, a large lodge on the East Arm of Great Slave Lake, formerly owned by a southern company has been purchased by a group of Yellowknife residents.

These additions bring to 125, the number of businesses directly related to tourism, comprised of 44 hotels/motels, 44 fishing lodges and 37 outfitters.

Management assistance and training grants were made to the Padlei Co-op for its Eskimo Point Hotel, to the Ekaloktotiak Co-op for its hotel at Cambridge Bay, to the Toonoonik-Sahaonik Co-op in Pond Inlet for its hotel and to Seeneetavik Hotel in Broughton Island.

Centered in Frobisher, the Eastern Arctic Visitor's Association was formed in early 1976. Membership is open to airlines, hotels, co-ops, outfitters, settlement councils, tour operators and other businesses and persons interested in promoting tourism in the Eastern Arctic.

Employment and Training Division

The Employment Division has a small staff group in Yellowknife providing an interdepartmental co-ordinating role for manpower training and development and a field staff of eight administering programs which are designed to meet labour force needs.

There are at this time 42 middle management training positions established within the Territorial Public Service to provide training on the job and career development for northern residents.

Apprenticeship continues to be a most effective program for the development of skilled tradesmen. There are 328 apprentices working across the territories, approximately 80 with the territorial government and the rest with private industry.

In the past year, 85 tradesmen were certified as journeymen in the NWT; an additional 18 tradesmen received Interprovincial Seals on their NWT certificate which allows them to register as a journeyman in whatever province or territory in Canada they choose to work. Nineteen apprentices completed their training programs and were certified as journeymen. The apprenticeship program continues to expand as industry requires further technical skills and the number of apprentices registered has increased 14 per cent over the year.

Planning and Development Division

Interest in forestry research continued during the year with two major studies being completed: Guidelines and Groundrules for the utilization of the Forest Resource in the NWT and a feasibility study of a Wood-Concrete Plant.

Studies concentrating mainly on employment impacts and spin-off opportunities from proposed resource developments in the Mackenzie have been completed. Attention has also been given to proposed developments in the Eastern Arctic.

A resource liaison function was established to provide technical information on non-renewable resource developments in the NWT to the various government departments and agencies.

Hire North Project

Formerly a part of the Petroleum Resource Development Group, Hire North was established as a separate entity in 1976. The department has direct responsibility for financial and administrative control, including production and training efficiency under the terms of an agreement with the Department of Indian and Northern Affairs.

The camp at River Between Two Mountains employed 48 people during the year, of whom 37 are native northerners. Thirteen

students have continued their training as heavy equipment operators.

Twenty-five kilometers of road have been constructed to finished grade; another 4.27 km have been graded and one four-metre culvert and a smaller culvert have been installed. A total of 917 825.8 m³ of earth fill and gravel have been hauled since the construction phase was commenced in 1973.

Department of Education

The major effort of the Department of Education during 1976 was directed at presentation of a new Education Ordinance to the Northwest Territories Council. A major effort was undertaken to provide summaries of the draft

Ordinance to all interested parties with a request for comments, suggested changes and reactions.



A typical classroom in the Northwest Territories

At the October session, after discussion it was decided to defer the bill to January 1977. The major intent of the legislation is to provide for local control of education. There

would be three levels of local administrative control.

Enrolment in elementary and secondary grades in most of the northern schools did

not increase significantly over the last year. The one major exception was the city of Yellowknife where a rapid population increase has caused the department and the Yellow-

knife Separate School Board to begin serious planning for a new school to be constructed during 1977. A slight increase to about 12 894 students is estimated for 1976.

Continuing and Special Education

Programs in education that are not designed for children of normal school-age, are the responsibility of the Division of Continuing and Special Education. This includes a variety of adult education programs, business education, community development, housing maintenance, education of the handicapped, teacher education and a wide program in vocational education.

General Education Programs

Community adult education programs are under the direct supervision of the local superintendents of education. Full-time community adult educators are responsible for programs in 26 communities throughout the Northwest Territories. Although the major concern is the improvement of basic literacy, other important programs include academic upgrading, life skills, basic job readiness training, leadership training and community development.

Of prime importance during 1976 was the development of a comprehensive training program to assist northern native people in becoming adult educators. This training program is now developed to the stage where trainees are being actively recruited throughout the NWT.

Health and Social Services Programs

The Home Management Programs in the NWT are co-ordinated and delivered by 11 permanent staff members, 26 local leaders and five short-term contract workers along with the assistance of the adult educators.

Training programs for the local leaders have improved and the administration has been simplified anticipating turn-over to the local Education Advisory Boards. The training program for native staff members in Home Management has been refined to include a detailed job analysis and complementary self-instructional packages. The objective of the training program is to increase independence on the part of the trainee.

Guidelines have been designed for nutrition programs in day care centres, community education programs and in-service training

programs. There has been extensive use of the media as an educational tool for nutrition material.

Continuing Education arranges training for disabled persons so that they will have a better chance of finding suitable employment. Fifteen applications for training were approved.

Technical and Business Programs

Pipeline, mining, highway construction, and tourism related activities created the major demand for education and training in technical and business programs during 1976. Working in close co-operation with the federal Department of Manpower and Immigration, and under the guidance of the Territorial Manpower Needs Committee, the division kept tuned to the accelerated economic development in the North and was able to respond quickly to identified training needs.

Small Business Management courses were conducted in the communities of Tuktoyaktuk, Spence Bay, Pond Inlet, Rankin Inlet and Fort Simpson and general business education courses were offered at Inuvik, Hay River, Pine Point, Yellowknife, Rankin Inlet, Frobisher and at the Adult Vocational Training Centre, Fort Smith.

The division is working in close co-operation with the NWT Chamber of Mines and the Geological Branch of Indian and Northern Affairs in designing and conducting programs to meet the needs of the mining community. Basic courses in mineral identification and claim staking were offered in the Baffin and Keewatin Regions and in the Yellowknife area. These were followed by an advanced course in general prospecting at the Fort Smith Adult Vocational Training Centre.

A training program to prepare northerners to manage and maintain Arctic class B and C airports was developed during the year. This program was developed in co-operation with the Department of Local Government and Transport Canada.

An experimental pilot project in house construction was conducted in co-operation with the NWT Housing Corporation. The communities of Cambridge Bay, Rankin Inlet and Frobisher were selected for the project.

Adult Vocational Training Centre

The Adult Vocational Training Centre at Fort Smith continued to provide the leadership in full-time technical and vocational training pro-

grams in the North. A varied program is offered including pre-employment courses, skill upgrading and extension courses, apprentice theory courses and teacher education program.

Program Development

During 1976 the Program Development Division undertook a number of projects involving co-operation with native organizations. The Metis Association was assisted in compiling a pictorial history of Metis in NWT. The division worked with the Inuit Cultural Institute in disseminating the findings of the ITC Language Commission and in incorporating them into the school curriculum.

Work continued on developing an Athapaskan language program in schools along the Mackenzie. In conjunction with the federal government an Athapaskan language study group was formed.

A brief account of the Fifth Thule Expedition was written in a bilingual version for junior high students. An account of the aboriginal peoples in pre-contact time called *The Book of Dene* was completed. A nutrition program designed for elementary schools was also devised.

Inuktitut Learning Services

Inuktitut Learning Services provides instruction in teaching English as a second language, in addition to its basic function of providing instruction and instructional materials in Inuktitut (Eskimo Language). Three courses were given to some 27 students in Rankin Inlet, Saskatoon and Frobisher.

This section also provided assistance in the preparation of curriculum materials; participated in workshops and training sessions for the Interpreter Corps; instructed in the Teacher Education Program; and was represented in a joint Federal-Territorial project for a rationalized syllabic typewriter.

The section participated at an advisory level, in the work of the Language Commission, first at the request of Inuit Tapirat of Canada, and then under the auspices of the Inuit Cultural Institute.

School Construction

Sir John Franklin School in Yellowknife received an addition which will house four new science labs for biology, chemistry, physics



Motor mechanics training at the Adult Vocational Training Centre, Fort Smith

and general science. This addition also provides a large gymnasium.

The department supplied new portable classrooms in 1976 to Resolute Bay, Pelly Bay, Coral Harbour, Sanikiluaq and Repulse Bay.

Preliminary site work and drawings were done on an addition to the school in Cape Dorset. Work on the building will commence as early as possible in 1977 with completion anticipated for use early in the 1977-78 school year. The addition will contain two

additional standard classrooms, one library/resource centre and a continuing education room.

Teaching Staff

The size of the teaching staff has been held relatively constant due to both financial restraints and the low growth of the pupil population. There are now over 50 northerners employed as teachers, which represents almost 10 percent of the teaching force.

Student Residences

The continued extension of grades taught in settlement schools has brought about a reduction in the number of students in residences and, in turn, resulted in the closing down of many. Most recent, Fleming Hall in Fort McPherson closed its doors in May of 1976.

Student Travel and Exchange Programs

Many students from across Canada's Arctic took part in a wide variety of travel and exchange programs both within the territories and outside to other parts of Canada. The Department of Education provides limited funding to encourage students to participate and the students obtain the balance of their financial support through their own ingenuity.

Two schools participated in the Young Voyageurs Program---Joseph Burr Tyrrell High School in Fort Smith with Boisseyain High School in Manitoba and Diamond Jenness in Hay River with CFB Shilo High in Manitoba. Joseph Burr also visited Uranium City, while students from Chief Jimmy Bruneau School in Rae-Edzo travelled to Edmonton and Calgary as part of the project "Canada Woha Ts'endo" which they had organized.

AVTC students from Fort Smith visited Edmonton and Keeveok School in Spence Bay held an exchange with a school in Toronto. Five students from Cambridge Bay travelled the original fur trading route from Thunder Bay to Winnipeg by canoe, visiting various groups and communities on the way. Twenty-two students and staff from Frobisher met with Greenlanders in Sondrestromfjord in March. Frobisher students then went on to Holsteinborg while the Greenlanders left for Frobisher.

Department of Social Development

The Department of Social Development has continued its attempts to find ways in which municipalities, settlement councils, community associations and concerned individuals can alleviate or prevent community problems. Examples include: juvenile court committees, welfare advisory committees, volunteer probation officers, local appeal committees (re social assistance) and a variety of associations concerned about alcohol problems.

In response to community concerns about the lack of job opportunities, the Subsidized Term Employment Program (STEP) was developed by the Department of Economic Development and Tourism and the Department of Social Development. Through STEP municipalities, settlements and local housing associations can receive funding for projects which

will employ persons who might otherwise be dependent on social assistance.

Special Services

The Special Services Division is involved in the development, maintenance and co-ordination of community based social services to meet the needs of children and adults within the Northwest Territories. The principal program is child welfare, but also included are juvenile probation, day care, homemaker services, services to the handicapped and aged.

Citizens expressed continuing concern about juvenile delinquency. Several new Juvenile Court Committees were established under Section 21 of the Juvenile Delinquents Act. These committees located at Fort Smith, Fort Simpson, Hay River, Inuvik, Frobisher and Cape Dorset are actively working with youth, parents and other agencies to provide guidance.

The Department of Social Development, following consultation with interested groups, finalized a policy on subsidization of child day care in the Northwest Territories. Several new day care centres commenced operation and the program is becoming more popular as more parents seek to upgrade their education or enter the employment field.

Corrections Services

The objective of Corrections Services is to carry out the sentence of the courts and educate the offender in the conduct required of a law-abiding member of the community.

Community-based services are provided by a staff of 40 probation officers. During the year, 107 pre-sentence reports were researched and submitted and 224 persons were placed under probation requiring supervision.

In July the Edmonton District Office of the National Parole Service instituted a sub office at Yellowknife. This office co-ordinates Parole and Penitentiary Services functions in the territories by guiding and assisting parole agents and parolees as required.

The territories is gradually introducing the concept of service to the community instead of a prison sentence in keeping with a trend in Canada to reduce the number of offenders sentenced to imprisonment.

The Yellowknife Correctional Centre has a capacity for containment and training of 70 men and eight women under minimum to maximum security conditions. During the past year, 327 men and 36 women were admitted,

the daily average population being 80 per cent capacity.

With a capacity for 20 men, the Baffin Correctional Centre had 36 inmates during the year, under conditions of minimum security. The daily average was nine persons. The Baffin Centre emphasizes Eskimo cultural land skills in its rehabilitation approach and functions with no disturbances in its largely Inuit staff and inmate population. In 1976, an Inuit staff member was appointed as superintendent.

The South Mackenzie Centre also has a capacity for 20 men with an average daily population of 16 and a total of 125 admissions during the year. The Centre's program emphasizes Indian cultural land skills, and the staff and inmates go out on the land for hunting, trapping and fishing. Valuable skills were obtained during the construction of line cabins.

A Justice and Corrections Advisory Committee was formed during the year to co-ordinate criminal justice activities in the territories. Composed of Dene, Inuit and senior government members, the committee examines and studies the application of police, court and correctional procedures to northern offenders, and makes recommendations to the Commissioner for the improvement of services.

Social Assistance

Those sections of the Social Assistance Ordinance that provide for appeals by recipients were declared in force by the Commissioner, effective June 1, 1976. Local appeal committees have been established by several community councils and more are doing so. A final level of appeal is to the Social Assistance Appeal Board, which is chaired by Member of Council, Tom Butters of Inuvik.

As a result of Territorial Council direction, social assistance regulations were amended to provide an "incidental allowance" of \$60 in calculating the monthly budget requirements of families in which the applicant is 65 years of age or older.

Alcohol and Drug Program

The rate of alcohol consumption appears to be slowing in the NWT with the single exception of Yellowknife. The rising population and relatively high disposable income are likely reasons for Yellowknife's rising rate of consumption. Referendums on alcohol availability held in some communities are responsible in

part for the decrease in per capita consumption, notably in Fort Rae. Also, the decrease in smaller communities is attributable to price increases over the past two years.

A significant change took place in Frobisher this past year when residents circulated a petition demanding closure of the liquor outlet. Due in part to the overwhelming support of the measure, and the number of problems created by alcohol in the community, the Commissioner ordered it closed. Current indications, such as court dockets and hospital emergencies, suggest that this decision is successful in effectively reducing alcohol related problems.

The NWT Alcohol and Drug Co-ordinating Council has become the Regional Advisory Board for both the Native Alcohol Abuse Program and Non-Medical Use of Drugs Directors' Innovative Service Program. This procedure has allowed the Alcohol and Drug Co-ordinating Council and the National Advisory Board for the Native Alcohol Abuse Program to fund a variety of programs separately or jointly.

Koe Go Cho Society (Fort Simpson), Resolute Bay Alcohol Information Centre, the Back to the Land Program in Fort Good Hope and a Back to the Land Program in Igloolik received grants.

The Alcohol and Drug Co-ordinating Council continued support of Northern Addiction Services Programs (formerly Yellowknife Committee of Concern) and the Peel River Drop-In Centre in Fort McPherson.

NWT Medical Care Plan

The NWT Medical Care Plan began operation on April 1, 1971. This plan covers almost all medically necessary services rendered by physicians and surgeons for all eligible residents.

Territorial Hospital Insurance Services

Guidance and executive authority for the administration of the Territorial Hospital Insurance Services Ordinance is provided by the Territorial Hospital Insurance Services Board. Medical advice is provided by medical advisers who adjudicate disputes over length of stay in hospitals and the propriety of charges for physicians' services.

Construction commenced in the fall of 1975 on an expanded hospital and health centre for Hay River. The official opening of the in-patient section of the new facility was held on

September 10, 1976. The new centre will provide expanded outpatient and emergency services; facilities for an active community home care service operating as an outreach program for the hospital; space for Public Health offices and Area Social Development offices.

The program for the new Fort Smith Health Centre was completed in November, 1975, and an architect was appointed in December. Detailed planning commenced during 1976 with construction scheduled for 1977-78.

The completely new facility will consist of an ambulatory care service for outpatients and emergencies, and space for physician offices, Public Health offices, Area Social Development offices, special clinics, and a community home care program.

Department of Local Government

Throughout the past year the Department of Local Government continued its work in strengthening councils and their administration. The objectives are to improve their planning and management of municipal functions and services, and to help them achieve an awareness of democratic processes.

Research and Development Division

A major project of the Research and Development Division in 1976 was the creation of a new training program. The new program is available to settlement secretaries, hamlet secretary managers, council chairmen and councillors, municipal administrative officers, local government officers and anyone else involved in local government or community associations.

Training events offered include workshops in accounting and accounting systems, working with small groups, and organization and functioning of councils.

Applications for hamlet status were received from three Keewatin communities. If these applications are approved, Repulse Bay, Baker Lake and Eskimo Point will become hamlets in 1977, joining 13 others.

Regional Council Conferences were held in Igloolik, Repulse Bay and Fort Franklin. These conferences were organized and conducted by the communities themselves.

During 1976 the division played a major role in enabling communities to hold liquor plebiscites.

Municipal Division

During 1976, industrial and residential construction in most municipalities necessitated major site development programs such as water/sewer facilities, road construction and street lighting. This type of expansion brought pressure on the municipalities to provide additional road maintenance, fire protection and related services which were subsidized under approved NWT Government policies.

Four new hamlets were incorporated as municipalities in 1976; Arctic Bay, Igloolik, Sanikiluaq and Whale Cove, bringing the total of incorporated municipalities in the Northwest Territories to 20, of which seven are fully tax-based.

Forty assorted units of mobile equipment were shipped to various Arctic communities for municipal services such as water delivery, fire protection, road and airstrip maintenance. Fire halls, parking garages and various buildings used for municipal purposes were constructed in Gjoa Haven, Aklavik, Broughton Island, Rae Lakes, Sanikiluaq, Whale Cove, Baker Lake and Igloolik.

The joint program with Transport Canada for the upgrading of northern airports is well underway and airstrip construction was completed in Sanikiluaq, Coppermine, Eskimo Point, Fort McPherson, Lake Harbour and Rankin Inlet. A training program in airport maintenance and air-to-ground communications has been implemented. This program is designed primarily for local residents.

In collaboration with the NWT Association of Municipalities, a complete revision of the Municipal Ordinance has been undertaken. This legislation will reflect the latest trends in municipal autonomy and fiscal control.

Town Planning and Lands Division

Throughout the Mackenzie Valley, the outstanding land claims question and the Berger Inquiry into the Mackenzie Valley Pipeline remained the main issues of importance. The evolving land claims issue has made a number of predominantly native settlements reluctant to make local town planning and lands matters a priority, out of concern that any decisions made might adversely effect the outcome of their land claim negotiations.

The larger municipalities within the Valley Corridor, however, have been actively preparing for the pipeline possibility by updating their general development plans and related engineering work. Hay River and Fort

Simpson have carried their planning to implementation stage by passing zoning by-laws.

The communities of Fort Rae and Fort Liard began work on planning documents. An overall redevelopment plan for Fort Rae was initiated as the hamlet council and the territorial government saw the need to re-examine the previously adopted development freeze and to promote a program of rehabilitation and expansion for the community.

At Fort Liard, the division in consultation with the local people, prepared a growth plan for the settlement. To implement the plan and move towards a consolidation of development, a major land purchase was negotiated. This newly acquired land was subdivided and is now being offered for sale.

At Hay River staff of the division, working closely with the Band Council, developed a land use and subdivision plan for the Hay River Indian Reserve. The first phase of the plan was legally surveyed in preparation for development. In addition to assisting the Band with its planning, the division is acting as administrative agent for the Band on lands within the reserve.

New General Development plans were begun at Arctic Bay and Igloolik, and the Hamlet of Rankin Inlet initiated an updating of its plan.

Department of Natural and Cultural Affairs

The Department of Natural and Cultural Affairs was first formed in 1976 to bring together government programs relating to the cultural and traditional way of life of northern people. Included are the operation of a fish and wildlife program, recreation, public library services, and a museum and historical sites program.

Fish and Wildlife Service

The Fish and Wildlife Service has the responsibility of managing the wildlife resources of the Northwest Territories, as well as providing opportunities for northern native people to pursue traditional hunting, trapping, and fishing.

The Outpost Camp Program is designed to provide financial assistance to groups who wish to move back to the land and live off the natural resources available through hunting and trapping. Assistance is made available to cover transportation costs, cost of

building materials for cabins, heating fuel north of the treeline, and revolving loans for the purchase of food and supplies. Twenty-seven groups, ranging in size from one family unit to multi-family units totalling over 50 people, were assisted in setting up outpost camps on the land.

It is anticipated that over the next few years many of these outpost camps will become nearly or completely self-sufficient and that people will be able once again to live their traditional life style with a minimum of financial assistance.

Near record fur prices and greater interest in trapping and hunting brought the total value of wild fur production to \$2 750 000 up from last year's total of \$2 000 000.

A strong market demand was found for nearly all species. Lynx pelts sold for an average value of \$163.07 which was double the price received the previous year, although the production declined reflecting a low in the natural cycle. Fox prices reached record levels for the past decade with averages over \$50 per pelt for coloured varieties and \$25 for white fox. The muskrat production increased from 138 000 to 183 000 and the average values went from \$1.90 to \$3.69 per pelt during the past year. 34 270 seal skins were produced at an average value of \$23.65 per skin.

The only notable decline in prices was for polar bear where the average value dropped from \$640.16 to \$449.75.

Test fisheries projects were carried out at several locations to determine the feasibility of commercial operations to supply the domestic market. One such project, at Nettiling Lake on Baffin Island, demonstrated the viability of supplying some 75 000 pounds of Arctic Char to communities on South Baffin Island. This project has been turned over to the Department of Economic Development as a commercial operation.

Fishing projects operated during 1976 included the harvesting of 30 000 pounds of Arctic Char from Hall Lake on Melville Peninsula for distribution to the communities of Arctic Bay, Hall Beach, and Igloolik.

Continued hydrocarbon and mineral exploration and development, as well as proposals for construction of natural gas pipelines, has resulted in greater involvement of the Fish and Wildlife Service in environmental management through participation in various federal/territorial committees which regulate these activities. Close contact has been maintained with settlement hunters' and trappers' associations and their concerns have

been passed on to the committees involved. Guidance has been provided to industry in conducting impact assessment studies, particularly relating to pipeline construction, and joint industry/government funding has been arranged to launch field studies of wildlife populations in the areas concerned.

The route of the proposed Eastern Arctic Pipeline received considerable attention from fish and wildlife biologists during 1976. Polar bear tagging studies were carried out north of Spence Bay and in the Keewatin District. More caribou than expected were encountered in these areas. The endangered peregrine falcon appeared to be present in encouraging numbers and apparently enjoyed excellent nesting success in these areas.

Study of the bison population in the Slave River lowlands continued, with emphasis on a study of the effect of wolves on this population. The wood bison in the Mackenzie Bison Sanctuary near Fort Providence are continuing to increase and expand their range.

The Northwest Territories Game Advisory Council met for the first time in February, 1976. The council advises the Commissioner of the Northwest Territories on matters pertaining to wildlife management policy and legislation. All members of the council are from the North and represent the Inuit Tapirik of Canada, the Northwest Territories Metis Association, the Indian Brotherhood of the Northwest Territories, and the outdoor recreation industry. During the four meetings held in 1976, the major task of the council was the review of a proposed new Wildlife Ordinance for the Northwest Territories.

Museum and Historical Program

Construction of the Territorial Central Museum at Yellowknife continued during the year with completion of the total facility now scheduled for late 1977 with the formal opening in the summer of 1978. Dr. Robert Janes, formerly of the University of Calgary Department of Archaeology, has been appointed Museum Director.

The Territorial Central Museum will be the focal point for the implementation of the Northwest Territories Museum Policy. In addition to maintaining collections and producing exhibits which will emphasize the prehistory, ethnology, history and natural history of the Canadian Subarctic and Arctic, one of the primary objectives of the Central Museum is an extension service in support of community and regional museums.

Several such museums are either opera-

tional or in the planning stage, the most notable among those in operation being the Northern Life Museum at Fort Smith and the Inuit Museum at Igloolik.

To keep pace with changing requirements and circumstances, a Northwest Territories Heritage Council has been appointed by the Commissioner of the Northwest Territories. This council, representing ethnic groups of the North, historians and business, will be concerned with the whole range of heritage matters and will give advice, guidance and direction in overall programs of museums, historical sites and archives, and provide liaison with other interested associations and individuals, both in and out of the North.

Groups eligible for funding under the Northern Native Historical Grant Program have availed themselves of the full amount allocated to the program in the past year. Worthwhile historical research has resulted. There is a prideful interest in their history and past achievements among the native groups of the North.

During the year the federal government amended legislation to allow direct and full representation from both the Northwest Territories and the Yukon Territory on the National Historical Sites and Monument Board.

Library Services

The Territorial Library Services Division supports local libraries in communities throughout the territories by supplying books and financial support for hiring of local librarians. By the end of 1975, nearly 70 000 volumes were available to territorial residents through member libraries.

Circulation figures for 1975-76 showed an increase of about 13 per cent over the previous year and were nearly back to the total reached before the advent of live television.

The Children's Program continued with book talks and puppet shows by the Children's Librarian to classes, from kindergarten to grade 9, in schools across the territories. By the year's end this program covered 237 classes in 18 schools.

By mid-year, Canada Council contributions of kits of 200 books by Canadian authors had been distributed to eight member libraries and two school libraries.

The government library, in Yellowknife, operated as a service to headquarters staff and members of the Territorial Council, had increased use during the year.

Recreation

The Recreation Division continued to develop and implement programs in consultation with sports groups and communities. The key to these programs is local involvement, training of community recreation leadership and leisure time education at the community level. Three major leadership development workshops were held during the year, covering the Keewatin, Central and Western Arctic areas. Fifty-two delegates representing 25 communities attended the workshops, which stressed development of leadership at the community level and development and implementation of community recreation programs.

Two cultural development workshops were held with technical and financial assistance from the Recreation Division. The first of these unique workshops was held at Fort McPherson with representatives of the Loucheaux Indians from communities of the Mackenzie Delta, the Yukon Territory and the State of Alaska. The second, with representatives of the Hareskin Indians from settlements of the Central Mackenzie, was held at Fort Franklin. Delegates at both workshops discussed traditions of their people and initiated study and preservation of their culture.

The Northern Games, a gathering of Inuit and Indian people from across the North to participate in traditional games and activities, was held at Coppermine on the Arctic Coast in July. As usual, this event was very successful, attracting spectators from throughout Canada.

During the 1976 Olympics, demonstrations of cultural games and activities were carried out by 40 Inuit and Indian performers from the Northwest Territories. The group performed over a four-week period in Montreal, Sherbrooke and Kingston.

The largest single undertaking of the Recreation Division in 1976 was participation in the Arctic Winter Games in Schefferville, Quebec. The games bring together athletes from across the Arctic, including the Northwest Territories, the Yukon Territory, Arctic Quebec, and the State of Alaska, in serious but friendly competition. The Northwest Territories was represented by 246 competitors representing communities across the territories. Over 1 000 athletes competed in playdowns in 13 sports to represent the territories.

Department of Finance

Finance and Office Services

The Finance and Office Services Division is responsible for processing and recording all of the financial transactions of the Government of the Northwest Territories, for general communications, and for the central filing services. The volume of work processed by the Financial Operations Division is reflected in a comparison of the annual government budgets for the past six fiscal years and the projected new year.

Budgets and Fiscal Planning Division

The Budgets and Fiscal Planning Division is responsible for the review and co-ordination of the government budget from the development of the fiscal plan and financial forecasts through to the preparation of estimates of expenditures for the Public Service.

The division served as a staff support to a committee chaired by the commissioner that laid the groundwork for a new system of federal-territorial financial arrangements.

This new system, which led to the development of the 1976-77 budget, brought with it greater financial authority, and responsibility.

Systems and Computer Services

The Systems and Computer Services Division provides analysis of management systems, recommendations for improved manual or computerized operations, preparation of forms and manuals, design and writing of computer processing systems, and operation of electronic data processing equipment.

The management services group has added two analyst positions. A complete review of the government financial system will be undertaken by the financial analyst, while other analysts continue to carry out management studies for all departments.

The systems and programming group continues to stress the development of systems to provide program managers with the operating information they require, rather than simply mechanizing clerical tasks. An information retrieval system for polar bear research data is being installed. Significant advances have been made in the social systems (health care and social assistance) in the provision of better management information. A computer system is being installed to optimize the design

of roads. In addition, feasibility studies in other areas are being carried out to determine the suitability of computerization of new applications.

Supply Services

The Supply Services Division is responsible for the purchase, transportation and warehousing of materials and equipment for all departments of the territorial government.

The Petroleum, Oil and Lubricants (POL) Section maintains a computerized program for the acquisition, inventory control, and distribution of petroleum products throughout the North. Local residents participate in planning tank farm locations, product distribution, tank farm operation, and in setting standards which will protect their environment in case of oil spills.

A five-year program has been initiated to upgrade fuel tank farms and increase capacity in order to meet the growing community requirements. The total storage capacity now exceeds 50 million litres of heating fuel and 8.1 million litres of gasoline, with a value of \$5.5 million.

In 1977 a program to provide for the storage of bulk aviation products will be introduced in order to help offset rising transportation costs by providing cheaper aviation fuel.

Energy conservation programs, such as the utilization of waste heat from power plant operations, are being implemented in order to offset the increasing cost of petroleum products.

The Transportation Section is responsible for the movement of cargo by all modes of transport into and within the Northwest Territories.

Centralization of authority has enabled the NWT Government to take advantage of cargo consolidation at three major supply points and reap the benefit of the lower costs offered by the developing multi-modal transportation systems. Particular emphasis is placed on employing local people to handle cargo at the community level. OPI + The Purchasing Section provides an effective, centralized procurement service by obtaining all operation, maintenance and capital materials required by departments of the territorial government at the best price and terms possible from local vendors located in 64 settlements in the territories and from major supply sources located across Canada. Twenty-three percent of government requirements were purchased from northern firms in 1975-76.

Liquor Control System & Liquor Licensing Board

The Liquor System is responsible for the importation, distribution and sale of liquor to the public and licensees within the territories. As well the system provides administrative support for the Liquor Licensing Board and directs the operation of the liquor inspection system.

Sales in 1975-76 were up 14.6 per cent over that of the previous year, reaching \$11 000 000.

Amendments to the Liquor Ordinance enabled small settlements to petition for and hold local option plebiscites requesting the complete prohibition of liquor in their communities. Rae Edzo became "dry" in August.

Department of Public Services

The Department of Public Services provides a wide range of services to the other departments of the territorial government and to the public at large. The department is responsible to the Commissioner for negotiating the Police Agreement providing RCMP services for policing the Northwest Territories. A new five-year agreement has been concluded.

Legal Services

The Legal Services Division, in addition to supplying legal services to the government, also provides direct assistance to the members of the public who wish to make claims under the Criminal Injuries Compensation Ordinance or who require enforcement of family maintenance orders. The division is also responsible for drafting, publication and distribution of ordinances and regulations.

The Legal Services Division has become actively engaged in prosecutions under the Territorial Ordinances such as Workers' Compensation and Labour Standards. A chief Enforcement Officer has been appointed to coordinate the program under a lawyer in the division with a view to a continued expansion of the program.

Public Trustee

The Public Trustee acts as administrator of the estates of deceased and missing persons, the committee of the estates of mental incompetents, and the guardian of children in court proceedings and trustee of their es-

tates. At present the Public Trustee is administering some 160 estates, of which approximately 50 are estates of children.

Inspector of Legal Offices

An Inspector of Legal Offices reports to the Director of Public Services and is responsible for the recruitment, training and administration of Justices of the Peace and Coroners.

The Inspector of Legal Offices acts as Chief Coroner and supervises the investigations of 75 coroners active throughout the Northwest Territories.

Commissioners for Oaths and Notaries Public are also recruited, trained and administered by this office where a complete registry is maintained of persons holding these positions.

Labour

In 1976 substantial amendments to the Labour Standards Ordinance came into effect. The ordinance was amended during the spring session of the territorial council, resulting in an increase in the minimum wage during June, and other major changes coming into force in November. The number of general holidays has been increased to nine, the working hours of persons employed in certain industries have been changed, vacation pay for long-term employees has been increased, the rate of general holiday pay has been altered, and wages have been further protected. In addition, a Labour Standards Board has been created to assist in the administration of the ordinance.

Safety Division

A safety officer was hired to enforce the Safety Ordinance. The ordinance and regulations set the standards to be provided and maintained by employers and employees for a safe working environment.

The Safety Division co-sponsored a number of community oriented safety programs such as the safe bicycling program, skidoo safety and safe boating.

There were 1 900 boiler and pressure vessel inspections, 2 100 electrical inspections, and 4 200 housing inspections.

The Safety Division maintains a film library of 92 safety and fire films. Films were used for public viewing on 275 occasions by community and industrial organizations.

Consumer Affairs

Since use of the services available to the public by the Consumer Division has increased, a second Consumer Affairs Officer was appointed. In addition to administering the Consumer Protection Ordinance, considerable enforcement responsibilities were also assumed under the Landlord and Tenant Ordinance. To publicize these activities two special booklets were produced and various other means were used to inform territorial residents of the help available to them.

The Consumer Division continued to work closely with federal authorities in the enforcement of the territorial legislation, and regarding such federal consumer areas as misleading advertising, agricultural products standards, weights and measures and labelling.

Legal Aid

Under the guidance of the Legal Aid Committee, appointed by the Commissioner under the terms of the agreement between the federal and territorial governments, a joint program for hiring legal assistance was operated. Use of legal aid increased by approximately 21 per cent.

Maliganiq Tukisiiniavik, the Frobisher Legal Services Centre, provided legal services at the Justice of the Peace court level to residents of Frobisher and Baffin Island. This service centre gave high priority to legal education. Another complementary operation was the Native Courtworkers Program which began in 1976-77.

The expansion of legal aid in the NWT provoked a study to investigate the co-ordination of operations with the aim of centralizing control of all the levels of legal aid.

Workers' Compensation

A study was conducted on upgrading existing pension benefits, granted before October 1, 1974. The Board has granted increases ranging from eight to 72 per cent effective January 1, 1977. These increases will be payable by the Board from the Workers' Compensation Fund.

Work continues on a feasibility study to determine whether the collective liability system of Workers' Compensation can be adopted in the Northwest Territories and whether a fully autonomous accident fund can be established.

During the 1975-76 period, 2580 new claims were processed; 1363 employers were

registered and payroll increased to \$175 855 019 from \$153 448 831 the previous year.

Court Services

The Court Services Division provides support services for the judiciary which consists of the Supreme Court, Magistrate's Court, Family and Juvenile Court and Justice of the Peace Courts.

Justice is dispensed to the people of the Northwest Territories by regular court circuits of the Supreme and Magistrate's Courts; the Justices of the Peace dispose of the majority of cases in the smaller communities.

In June, 1976, after 10 years of service as Judge of the Supreme Court, Judge William Morrow resigned his position and was appointed to the Appellant Division of the Supreme Court of the Province of Alberta, which also has jurisdiction in the Northwest Territories.

Of the 86 Justices of the Peace, 38 are of native origin and seven are women. They have jurisdiction to hear summary conviction cases. An instructional course was given to these court officials in Fort Smith in October, 1976. Regional courses are being planned for 1977.

Legal Registries

The creation of the Legal Registries as a separate division is an acknowledgement of the increased activity in the companies, co-operatives, credit unions, documents, securities, societies and land titles offices. A total of 2750 companies are currently registered to do business in the Northwest Territories, while 347 non-profit businesses or societies are currently on record.

The volume of land dealt with is increasing. A marked increase in the number of survey plans being registered was noted. The number of lots being created gives room for continued commercial and residential expansion.

Motor Vehicle Registry and Vital Statistics

The Motor Vehicle Registry registered approximately 15 350 vehicles and licensed approximately 14 550 drivers during the licence year. There were 340 motor vehicle accidents resulting in property damage of over \$1 300 000.

The Highway Transport Board issued 211 Certificates of Operating Authority. Throughout the year, the Board received 11

tariff filings and decided upon over 40 applications concerning operating authority.

The Business Licence Registry issued in excess of 600 licences to individuals and companies. This indicates a steady growth of business ventures in settlements and unorganized areas of the Northwest Territories.

The Insurance Ordinance was proclaimed April 1st, 1976. In excess of 65 insurance companies were licensed to carry on business. Resident agents were required to write examinations for the first time, ensuring the public of added protections.

Department of Personnel

The Department of Personnel has responsibility for the development and administration of a number of key programs geared towards improving organizational efficiency and individual performance and contribution. Departmental components include staffing, staff housing, classification and pay research, training and regional co-ordination, and employee relations. The past year has seen some important developments in the fields of senior management performance incentives, staff housing policies and training and development of opportunities for native northerners.

Staffing

The staffing section of the Department of Personnel completed 540 competitions during 1976. These competitions resulted in 560 appointments. Promotions from within the Public Service totaled 146; 72 were transfers. Intensified efforts at recruitment of NWT natives resulted in 418 jobs for natives in 1976, as opposed to 323 in 1975.

Staff Housing

Increases in staff housing were held to a minimum during the year with 36 units constructed in the settlements.

New policies and procedures have been introduced to provide a better control of accommodation standards and rental rates for employee housing. A central inventory system was established and it is being edited and modified for computer programming. The private accommodation allowance to employees providing their own housing was increased. Sixty government-owned houses in Yellowknife have been offered to employees on a lease-to-purchase arrangement where the

employee will gain title over a period of years. The calculations of rental rates has been changed to a fairer system of reflecting size of units in useable square feet.

Classification and Pay Research

The classification section was involved with implementing the new job evaluation system. Seminars were given in each region on the fundamentals of the system. A program of on-the-job audit has been implemented to ensure consistent application of the new system.

The executive approved the use of Hay Associates Ltd., Executive Compensation Consultants, who have worked with departmental directors on a program of a reclassification and performance-based salary plan for the senior management group of the government. This program was finalized and implemented during the last few months of 1976.

Staff Training and Regional Co-ordination

During 1976 a new employee performance appraisal system was implemented and several training courses developed. Training courses in interviewing, report and letter writing, employee appraisal, position description writing and classification were conducted. Future plans include a series of training programs to improve supervisory and managerial skills.

Employee Relations

Negotiations for new contracts were conducted between the government and two associations representing teachers and public servants. Significant changes were achieved, particularly in reaching an understanding of the government's goals to stimulate a greater degree of self-sufficiency by staff. Changes to staff housing policies and alterations to vacation travel assistance and ultimate removal assistance were some of the key points in the program.

Department of Information

Towards the end of 1976, the Department of Information began a comprehensive review of the effectiveness of its programs. The evaluation was particularly aimed at improvement of

the flow of information to communities throughout the NWT and the result was a recognition that it was time for the department to regionalize its information service to respond more directly to the needs of northern people in a manner that reflects their local requirements, culture and languages.

It was decided that the only way regionalization would have any long-lasting effect would be to utilize its interpreter-translator corps. Members of the corps are well-known by the government and the public.

Interpreter-Translator Corps

In 1976, 10 new positions were added to the Interpreter-Translator corps, bringing its total membership to 23. The interpreters are located in Frobisher, Rankin Inlet, Inuvik, Cambridge Bay and Yellowknife.

Unique in North America, corps members are accomplishing the very difficult task of both consecutive and simultaneous interpreting in the native and English languages. Interpreters, in each region of the territories, will become responsible for the communication needs of their local areas. They will originate information programming ideas and material that is in tune with local needs and use the department's headquarters establishment as a service agency for production. In addition they will establish a system to monitor distribution and circulation of material on a continuing basis to ensure an effective flow of information. The training courses will be provided to the interpreters, in order to accomplish this phase-in of additional responsibilities.

New interpreters recruited in 1976 began an extensive five-month training course in October. They started their course in Yellowknife where they gained a thorough understanding of territorial government programs and services and learned interpreting techniques and standards. Part of their training will also include a session at the language school in Rankin Inlet, followed by on-the-job training at Yellowknife and Frobisher.

Public Affairs Division

The Department of Information has also discovered the value of multi-language publications as a communications tool. One major production is a 16-page monthly newspaper, *The Interpreter*, printed in English, Eskimo syllabics, and some Western Arctic Eskimo orthography. The newspaper contains articles on government programs and services available to northern residents, as well as general

news of interest to the communities in which there is very little other media presence. It has a circulation of 10 000 copies in the North.

News releases, issued daily to 14 telex points in the North are used by the working press and are also posted in various locations for the general public. Weekly news briefs are also sent directly to all levels of municipal government.

Photographic services are provided by the Public Affairs Division, with black and white and colour developing and printing services and a photographic library containing 5 000 slides and prints.

In 1976 there was a much expanded use of the Anikinfo service of the Northern Television Service of the CBC. The CBC offers free time for public service messages. Some 30 slides with scripts were prepared for the various government departments.

Seventy-five display advertisements describing government services or part of the educational thrust of such programs as alcohol and drug use, nutrition, and fire prevention, were placed in NWT newspapers.

Publications and Production Division

The Annual Report of the Government of the Northwest Territories is one project of the department which assists in providing up-to-date information on the North to southern Canadians and people in other countries, as well as to northerners.

The Department of Information provides a centralized design and publishing service for the territorial government. During 1976 there was a greater utilization of this service by the various departments.

Information packages were prepared for several departments with communication needs. For example, Anikinfo messages, an annual report, newspaper advertising and promotional material were prepared for the health care section of the Department of Social Development to communicate to territorial residents ways in which they could fully utilize medical insurance services.

There were several joint publishing ventures with the Department of Education. Books published for northern people included: *Book of the Dene*, *Tales of the Angekoks*, *Native Craft Book*, and *The Thule Expedition*.

The Department of Information also published a biography of Captain Francis Crozier by May Fluhmann entitled *Second In Command*.

Department of Planning and Program Evaluation

During 1976, emphasis was on expansion of planning programs and increased capabilities to assess the effectiveness of programs and projects in meeting the goals and objectives of the Government of the Northwest Territories.

Planning Division

A major project during 1976 was the development of a regional plan for the Mackenzie Delta. This plan recommends the action required by both the territorial and federal governments to meet the impact on the delta of a proposed gas pipeline, proposed gas plants, further oil and gas exploration and other major developments in the delta area. The plan is intended to influence the manner in which the development takes place, to maximize benefits to the people of the NWT and to ensure the least possible negative effects.

The development of regional plans for the Eastern Arctic and the Mackenzie Valley south of the delta were also started.

Other major planning and research activities undertaken during 1976 include metric conversion in the NWT; development of a staff handbook; planning for the devolution of programs to communities; and communications planning.

Research began into the potential population and economic growth of the Northwest Territories with a view of making long range projections for utilization in long-term planning by the division and the various departments of the territorial government.

Program Evaluation Division

The Program Evaluation Division measures the efficiency and effectiveness of territorial government programs. Evaluations conducted to date include an assessment of the effectiveness of the financial aid program to NWT students, the recreation leadership program, the government management reporting system, and the Keewatin District Service Office.

There are 26 evaluations planned for the next 18 months. Some of these include an assessment of use of government vehicles by government employees; educational and career opportunities for northerners; the Hire North Project; and an evaluation of the organizational and financial aspects of existing

programs of assistance to hunting and trapping.

Science and Statistics Division

About 150 licences up 25 per cent from last year authorizing scientific research were issued. Under the Scientists Ordinance a licence can be refused only if a proposed research project might be disruptive. The advice of the community, through the local council, is sought before a licence is issued. Twenty-one licences were issued for potentially disruptive research, only after the 34 communities to be affected approved of the proposed projects. One licence was refused to a researcher on the advice from local elected officers and one researcher was asked to find alternate study locations.

Increased emphasis was given to statistics so that data available within and outside the Government of the Northwest Territories can be better used for decision making.

Territorial Audit Bureau

The recommendations resulting from the Auditor General's 1975 review of the Audit Bureau were implemented during 1976. An Audit Committee was established, chaired by the Deputy Commissioner. This committee conducts regular reviews of the audit work plan and observations on audits performed.

A number of northern organizations were assisted in establishing good financial management and controls. Auditors on field travel assisted with various bookkeeping functions in housing associations, settlement councils, craft projects and other activities. The Audit Bureau has also taken over the responsibility for performing audits within budget review hospitals.

Special Projects and Development Division

The new zinc-lead mine at Nanisivik on Baffin Island commenced production on schedule in October. The \$65 million complex will provide economic stimulus to an area previously void of major full-time employment opportunities. Nanisivik Mines Limited commenced production with a work force of 64 per cent Inuit.

The Northwest Territories financed a modern townsite and recreation facilities to serve the new residents. A general store owned and operated by the Kooniak Co-op of Arctic Bay will serve the new town which has modern television, radio, and telephone facilities.

These services have been extended to in-

clude the Hamlet of Arctic Bay, 32 km away. The two communities will be connected by a road now under construction and serviced by a 6 500 foot airstrip with jet aircraft service to Frobisher and Montreal.

Of primary concern in this project has been a determination to involve the Inuit who work at the project and in surrounding communities in the decision-making process.

Work commenced on other projects of a similar nature which are still in the planning and pre-planning stage. One of these is the possibility of a similar zinc-lead deposit being developed on Little Cornwallis Island. Negotiating has resumed with the division playing a key role. Consultation was undertaken in the settlements along the Arctic Coast to assure maximum local input by all settlements in the area.

Department of Public Works

The Department of Public Works provides support to the program departments of the territorial government, contributing to the development of the North.

Services include the planning and building of schools, offices, staff housing, water and sewer systems, garages, warehousing, campgrounds and roads. Another function is the maintenance on both light and heavy mobile and construction equipment.

The department is staffed by some 500 semi-skilled and skilled tradesmen and professional people.

Operations and Maintenance Division

The Operations and Maintenance Division provides professional and technical assistance and direction to the regional DPW establishments.

In 1976 a separate section was added with the aim of applying energy conservation to existing buildings and formulating energy conservation guidelines for new construction. The section is studying each major building with a view to adjusting systems to minimize fuel and power consumption while still providing adequate comfort conditions. The utilization of waste heat is another major objective.

The buildings and works management section concentrated its efforts on assistance to the Keewatin DPW establishment in upgrading the maintenance standards in the Keewatin settlements. A new 250 kilowatt gener-

ator was installed in the Sanikiluaq power plant and the plant was completely revised to service the rapidly growing power load in the community.

The property management section continued the revision and renegotiation of leases to achieve better maintenance standards by landlords and savings to the government. A lease-purchase agreement was signed for a new court house and office building in Hay River which is now under construction. Such arrangements enable the government to eventually acquire ownership without the outlay of capital.

Project Management Division

The Project Management Division is responsible for carrying out the government's Capital Construction Program. The total value of the program increased from \$20 000 000 to \$23 600 000 while the number of projects decreased from 281 to 171, which results in an increase in the average cost per project from \$91 740 to \$137 940.

Fifty staff houses were erected at various locations throughout the territories, and while this program traditionally has consisted of detached houses, this year 80 per cent of the staff houses are multiple housing units, located at Rankin Inlet, Resolute Bay and Frobisher.

The major school construction projects in 1976 were a new school at Gjoa Haven, and a large extension to the Sir John Franklin School in Yellowknife. Materials for the Gjoa Haven School were airlifted to the community, making it possible to reduce the construction time to five months for a project that otherwise would have been under construction over a two year period. The tender prices received for the project also showed that air-lifting under certain circumstances is economically competitive with surface transportation.

The first phase of the Territorial Central Museum was completed, and it is expected that construction of the last phase will start in the summer of 1977.

The first stage was completed of an extensive plan to provide adequate water and sewer services at Frobisher. New technology in pipe insulation has made it possible to avoid the cumbersome and visually objectionable heavy boxes usually associated with utilidor installations. The exposed sections of the new service installations at Norman Wells consist of individually insulated and protected pipes suspended under pile-supported

pipehangers, making installation and servicing easier.

The Resolute Bay new townsite program has continued with the installation of water intake facilities at Char Lake, a water treatment plant and the superstructure for the sewage treatment plant. Ten townhouses form the first part of the horseshoe-shaped structure that eventually will envelop and provide climatic protection for the community. Detailed design for the towncentre and all its facilities is now underway.

Highways Division

Construction of a 77 km section of the Mackenzie Highway between the Mackenzie River and the Willowlake River was completed and turned over to the Highway Division for maintenance upkeep. While this is an isolated highway section not useable in summer it can be integrated into a winter road connection between Fort Simpson and downriver communities.

The division co-operated with an oil exploration company in maintaining a winter road for motor vehicles between Tuktoyaktuk and Inuvik from January 1976 until April 1976.

A road was constructed between Nanisivik Mines and Arctic Bay on Baffin Island and is expected to be turned over to the territorial government by the federal government in 1977. The federal government provided funding and some equipment was purchased to undertake winter maintenance of this road in 1976-77 under a contract arrangement with Nanisivik Mines Ltd.

At the Mackenzie River crossing on the Yellowknife Highway, the *M.V. Merv Hardie* operated with several interruptions. Mechanical problems with the propulsion system required several one-day shutdowns during mid-season. The problems eventually required retiring the ferry from service for an extensive repair job in September. During this period a substitute vessel was hired from Kaps Transport.

Discussions were held with officials of Atlas Copco Ltd. who have successfully installed de-icing air bubbler systems mainly in Sweden. The feasibility is being studied of prolonging the ferry operational period on the Mackenzie River on the Yellowknife Highway. Plans were subsequently made to conduct a test. If the test proves successful, it will shorten the period between ferry shutdown and use of an alternative ice bridge for commercial traffic and reduce the costs for people

living in Fort Providence, Rae-Edzo and Yellowknife.

Reconstruction of the Yellowknife Highway between Edzo and Yellowknife was completed in 1976 as an assignment under the Northern Road Program. Other assignments included surveys for future reconstruction projects and commencement of a 27 km road linking the community of Jean Marie River to the Mackenzie Highway.

Northwest Territories Housing Corporation

Surpassing last year's production, the NWT Housing Corporation initiated 383 housing starts in 34 settlements. In addition, 23 Country Home Assistance Grants of \$5 000 enabled families to build their own homes from local material in areas where public housing is not available. Of the 383 units, 20 were for senior citizens, 23-single persons, 22-log houses, 20-stick built and 298-prefabricated. In all cases, the units met NHA standards and contained major interior and exterior improvements. In keeping with corporation policy of using northern tradesmen and labour whenever possible, local contractors were awarded 96 per cent of the construction contracts.

At the request of the corporation, a manufacturer of prefab housing units set up a temporary packaging site at Hay River, utilizing timber from local sawmills which produced a significant boost to the local economy.

With completion of backlog construction, the corporation is now responsible for the operation and maintenance of 3 612 units of accommodation in 47 settlements. This includes 3 428 northern rental and public housing, 103 senior citizens and 81 single person units.

Administering this housing for the Corporation are 46 housing associations and five housing authorities. They assess and collect rents, and handle local administration and maintenance. Rental revenues are retained by the associations as a supplement to their annual operating grants. This amounted to \$850 000 in 1976.

Increased fuel, power, water and other operating and maintenance subsidies for housing associations and authorities accounted for \$7.7 million of the Corporation budget of \$13.6 million. Capital costs were \$5.6 million and \$1.3 million was spent on administration. Total Central Mortgage and Housing Corpora-

tion allocation for Section 43 loans to the Northwest Territories Housing Corporation in 1976 amounted to \$12.3 million. In addition, the Corporation is taking out four loans for land assembly projects.

A major step forward during 1976 was the formation of a Northwest Territories Non-Profit Housing Corporation. This corporation helps building co-operatives and non-profit organizations in the building of homes and enables groups such as the Inuit Tapirisat and the Dene Housing Corporation to take better advantage of existing federally funded assistance. Through the assistance of the Northwest Territories Housing Corporation, four fully- equipped prefab houses were sold at a cost of \$23 000 each to the Yellowknife Housing Co-op.

To point out at first hand some of the housing problems of the North, the Corporation conducted Bill Teron, Chairman of the Board of Directors of the Central Mortgage and Housing Corporation and other federal officials on a tour of Eastern Baffin.

In a 71 page report to the Berger Commission on the Mackenzie Valley Pipeline, the Corporation emphasized the need for additional funds to alleviate an acute housing shortage and the need for a basic type of structure. A comprehensive planning and development plan under the direction of a special authority was recommended and it was pointed out that northerners should receive the same housing subsidies and privileges as other workers should the pipeline become a reality.

A disappointment in 1976 was the reluctant decision to terminate the log house program at the end of the year. New minimum insulation standards set by the Central Mortgage and Housing Corporation, although beneficial to northern homes, require the use of logs more than 25 cm in diameter, a product unavailable in commercial quantities in the Northwest Territories. Spiralling costs of material and labour and organic deficiencies in local timber also contributed to the demise of the program.

In March, the Corporation signed an agreement with the Central Mortgage and Housing Corporation to implement the Rural and Remote Housing Program. The objective of the program is to provide home ownership for low income rural and native groups in all communities except Yellowknife. Lengthy negotiations are continuing with the federal government to make the scheme applicable to our specific needs.

Government of the
Yukon Territory

Government of the Yukon Territory (GYT)

Administration of the Yukon Territory

Responsibilities

To administer the Yukon Territory in accordance with the Yukon Act, ordinances of the Yukon Territory and applicable federal laws.

Yukon Legislative Assembly

Responsibilities

The main responsibility of the Yukon Legislative Assembly is to exercise legislative authority as is designated by the Yukon Act.

Administrative and Legislative Support Services

Clerk of the Assembly/Secretary to Executive Committee

Responsibilities

The clerk ensures that the activities of the Executive Committee and its subcommittees are co-ordinated and that their decisions are implemented; provides legislative support services to the Legislative Assembly; provides administrative support services to the commissioner; and provides informational support services to all Yukon Territorial Government departments concerning changes in legislation and internal policy guidelines.

Review of 1976-77

At the spring session, convened on May 17, 1976, the Legislative Assembly passed the Public Service Commission Ordinance, establishing a Public Service Commission independent of the government.

The first session of the Legislative Assembly held in the new Chamber opened on November 2, 1976. The Speaker formally dedicated the chamber to all the people of Yukon and the newly appointed commissioner presented his first Speech from the Throne. One of the memorable features of the session was the introduction of the legislative page program. This involved eight volunteer students from a junior high school acting as pages.

This session saw the formation of two standing committees. The Standing Committee on Rules, Elections and Privileges was formed to review the Standing Orders of the Assembly, to develop guidelines for conflict of interest and to develop a legislative assembly ordinance. The Standing Committee on Yu-

kon Land Claims was formed to make recommendations relating to Yukon land claims. New ordinances passed included the Electrical Protection Ordinance and an ordinance respecting the Institute of Chartered Accountants. Amendments to the Liquor Ordinance were also passed.

The first session, which opened on March 1, 1977, considered the 1976-77 supplementary estimates, and 1977-78 main estimates. Several other bills were passed including the Insurance Ordinance, Real Estate Agents' Licensing Ordinance, Credit Union Ordinance, Recreation Development Ordinance and the Electoral District Boundaries Commission Ordinance. The assembly also approved amendments to the Elections Ordinance, Liquor Ordinance and Local Improvement District Ordinance.

Two additional standing committees were created - the Standing Committee on Constitutional Development and the Standing Committee on Statutory Instruments. An ordinance respecting the Legislative Assembly was introduced and will be reintroduced at the fall session along with the redefinition of electoral district boundaries to allow for the expansion from 12 to 16 members. During the year, the Executive Committee witnessed a number of changes. Mr. A.M. Pearson replaced Mr. James Smith as commissioner on July 1, 1976. January 14, 1977 Mr. M. Miller (assistant commissioner - administrative) resigned. This enabled the government to fulfil the commitment made in 1974 to phase out one appointed member of the executive committee during the life of the 23rd legislative council, thus giving a majority to the elected members.

During 1976-77, the government was active in the Yukon Indian land claims negotiations, and in planning for the future economic development of the territory. Efforts to plan for orderly development of the Yukon resulted in the creation of an Economic Research and Planning Unit and the establishment of a pipeline co-ordinator position to monitor all aspects of the various northern pipeline proposals that affect the Yukon.

Plans for 1977-78

A special sitting of the assembly is planned for June in Dawson City. This will occur in the original council chamber in the Yukon and is to commemorate the 75th anniversary of the incorporation of the city of Dawson. It is anticipated that the Elections Ordinance allowing the Yukon to run its own elections will be drafted and introduced in the assembly

during the fall session. At the same time an ordinance respecting the Legislative Assembly will be reintroduced bringing together under one ordinance qualifications and salaries for members, conflict of interest guidelines and certain other powers existing in 1958 when the ordinance was repealed.

Additional changes will occur in Executive Committee when Mr. P. Gillespie leaves the position of assistant commissioner in June 1977.

As part of the government's efforts to ensure proper development of the Yukon, a new Renewable Resources Unit is being established.

Public Service Commissioner

Responsibilities

On July 5th, 1976, the Yukon Legislative Assembly, by commissioner's order, brought into force the Public Service Commission Ordinance, thereby creating a Public Service Commission. The Public Service Commission is responsible for recruiting and selecting civil servants and teachers, job evaluation, pay administration, the negotiation, administration and interpretation of collective agreements, controlling staff establishment and conducting organizational analysis. The commission is also responsible for employee appraisal, safety, training, and fringe benefit programs.

Review of 1976-77

The following data represents recruitment activity:

Civil Service-Permanent Appointments:	
Yukon Residents	310
Internal Promotions	48
Internal Transfers	59
Outside Residents	32

Total Civil Service	
Permanent Appointments	

Teachers - Permanent Appointments:	
Yukon Residents	13
Outside Residents	79
Sub Total - Teachers appointed to permanent positions	92
Kindergarten Instructor appointments	11
Total Teacher and Kindergarten Permanent appointments	103

Civil Service -	
Casual Appointments	1,003
Teacher, Kindergarten and	
Aide Casual Appointments	246
Total Government Permanent and	
Casual Appointments	<u>1,908</u>

Of the 449 permanent civil service appointments, 93 per cent were residents of the Yukon. Turnover by resignation represented 28 per cent on a base of 996 full-time and part-time permanent positions. Actual movement which includes appointments, promotions and transfers represented 43 per cent excluding teachers and kindergarten instructors.

In the latter part of 1976-77, the government introduced financial restraint measures on the hiring of non-essential positions for the period November 5th, 1976 to March 31st, 1977 in an attempt to reduce overall government expenditures.

Job Evaluation and Pay Administration

Approximately 205 position transactions and 34 classification and pay amendments were processed. As part of a continuing program of review for rates of pay, approximately 42 classes of employment underwent pay research with provincial jurisdictions.

Staff Development and Training

Approximately 263 employees received some sort of financial assistance from the Public Service Commission to participate in training seminars, conferences, workshops, or to attend night school or complete correspondence courses. A considerable number of employees participated in first aid courses offered in Whitehorse and in outlying communities. Employees participated in courses in a wide variety of topics, including computer operations, fundamentals of budget formulation, introduction to supervision, managerial skills and counselling of persons with alcohol problems. A number of employees participated in extension courses in areas of commercial law, accounting, sociology, appraisal, pay and benefits and medical records.

Three employees were sent on pedagogical courses and one employee attended a full-time technical institute to complete a diploma. The Public Service Commission also liaised in

the area of on-the-job training in co-operation with the vocational rehabilitation program.

The Public Service Commission in co-operation with the federal government's Staff Development Branch, Vancouver Region, presented a public relations seminar specifically designed for the Yukon Government; approximately 50 secretaries and receptionists participated in the seminar and future ones are in the planning.

Staff Relations

The employer and the Public Service Alliance of Canada signed a one year collective agreement on May 12, 1977, effective April 1, 1977 to March 31, 1978.

On November 4th, 1976 the employer and the Yukon Teachers' Association signed a one year agreement, effective September 1, 1976 to August 31, 1977.

During the year, two grievances were referred to an adjudicator appointed by the Yukon Public Service Staff Relations Board. In addition, the application to the Yukon Teachers' Staff Relations Board for permission to prosecute teachers deemed to have illegally participated in a strike, was concluded; the board determined that a strike had occurred, the strike was illegal but that permission would not be granted for prosecution.

Safety and Security

1976-77 saw the rapid advancement and organization of regional safety committees throughout Yukon. The aim of the safety committees is to ensure that all reasonable measures are provided for the safety and occupational health of employees of the Yukon Government.

During 1976-77 the recruitment section completed the recruitment brochure for the civil service; this brochure continues to complement a brochure which is used for teacher recruitment activities. During the latter part of 1977-78, the employer will commence negotiations with the Public Service Alliance of Canada to renew their agreement which expires on March 31, 1978.

Economic Research and Planning Unit

The Economic Research and Planning Unit is a consolidation of positions within YTG di-

rectly involved in socio-economic research and planning. It was first assembled on October 1, 1976, when the three positions of the Land Claim Secretariat and two from Intergovernmental Affairs (effective April 1, 1977, one of these positions, the Manpower Needs Committee Secretariat was transferred to the Department of Education) were loosely amalgamated. The planning and statistical advisor position was reclassified as Chief Economic Research and Planning Officer and filled on November 29, 1976. The other two research and planning officer positions were originally classified as economic and tourism planner positions, respectively. These positions were filled by the end of January, 1977. Consequently, the unit became fully operational for the first time in February.

Within the Economic Research and Planning Unit, there are essentially three functional responsibilities: economic research and planning, statistics, and Indian land claims. While the research involved in these functions overlap, the first two deal more specifically with the economic nature of the Yukon, while the latter are more concerned with the social aspects of the territory. More specific objectives related to these three functional responsibilities are as follows:

Economic Research and Planning

Analyse and advise, as required, on any matters which pertain to the economic development of the Yukon. Major subject areas would include petroleum, electricity, pipelines, mining, economic accounts, and industrial planning;

to conduct an efficient information and reporting system which will service the needs of all decision makers;

to monitor the day-to-day activities in the Yukon economy, to determine where additional assistance or stimulation may be required; and

to act as a policy advisor to the government in the area of socio-economic issues, particularly the design of an adequate framework in which policy alternatives can be examined for their social/economic/political implications.

Statistics

to collect and disseminate statistical information pertaining to the Yukon;

to co-ordinate and monitor data collection and dissemination activities of Government and the private sector to prevent the needless duplication of such activity and the unnecessary response burden on the citizens of the Yukon;

to assist in the form of technical or other advice in the establishment of data collection techniques applicable to the Yukon; and

to represent the Yukon Territory on federal-provincial statistical committees in order to obtain the data necessary for the analysis of socio-economic issues in the Yukon.

Land Claims

to provide back-up research for the commissioner in his role as YTG's chief negotiator in Yukon Indian land claims;

to attend negotiating sessions and monitor land claims activities in Yukon, Canada, and elsewhere;

to prepare YTG position papers for executive approval on Indian land claims; and to assess the social, economic and constitutional impact of Yukon Indian land claims on the Yukon.

Despite the rather short time that the unit has been operating, the staff has been particularly busy. Aside from the many administrative duties required to get established, the unit has been involved in several major projects. With the resumption of Indian land claims negotiations on January 18, the land claims secretariat have been providing support services by attending the planning council sessions and supplying back-up research to the office of the commissioner.

During January, the unit was assigned to carry out a project which was first announced by the commissioner in his speech to the Chamber of Commerce. This project involves investigation of the means available to facilitate more public participation in the development of an economic plan for the Yukon.

Work has begun on the assembly of a statistical inventory and data base for the Yukon. Aside from these projects, the following are underway as of March 31, 1976:

Economic Development Plan for the Yukon Economic Model for the Yukon

Examination of Higher Costs of Food and Fuel in the Yukon

Industrial Opportunities in the Yukon

Consumer Price Index

Labour Force Survey

Economic Indicators

Statistics Inventory

Feasibility of Legalized Gambling in the Yukon

Feasibility of Home Manufacturing Industry in the Yukon

Feasibility of a Government Owned Insurance Company

Investigation of the Effects of Implementation of a Decentralization Policy of YTG

Socio-Economic Impact Study of the Clinton Creek Mine Closure
General Development Agreement and Subsidiary Agreements
Yukon Tourism Development Strategy
Socio-Economic Impact Study of a Rail Extension in the Yukon

The Economic Research and Planning Unit is the focal point for contact with Statistics Canada in the territory. As such, the unit is a member of 16 federal-provincial committees on statistics. Each of these committees meets at least once a year under the umbrella of a senior federal/provincial body known as the Consultative Council of Statistical Policy. Representatives on this committee are usually from the chief statistician's office in each province and the chief statistician for Statistics Canada. This is one of the few forums where the Yukon Government participates as an equal without reference to territorial status.

Representatives of the Economic Research and Planning Unit have also been involved in a number of activities of the Federal-Territorial Economic Planning Committee, which is a subcommittee of the Advisory Committee on Northern Development. Our main involvement has been in relation to the labour force survey, a family expenditure survey, and the generation of economic accounts.

In addition, the Land Claim Secretariat is attending and has participated in the negotiations taking place regarding a Yukon Indian land claims settlement.

The Economic Research and Planning Unit reports directly to the commissioner. The offices of the Economic Research and Planning Unit are situated on the lower level of the Territorial Administration Building next to the Game Branch. Among the services provided is access to a fairly extensive library of government and statistical publications. The chief of the Economic Research and Planning Unit may be reached at 667-5461.

Land Claims Secretariat

Responsibilities

To provide research and support services to the commissioner in his role as the YTG representative on the Planning Council - Yukon Indian Land Claims.

Review of 1976-77

The Secretariat was actively involved in land claim deliberations and was instrumental in preparing *Meaningful Government For All Yukoners*.

Plans for 1977-78

The Secretariat will continue to provide necessary research and support services for YTG representatives on the planning council, will participate in working groups established on settlement elements, and will act as a liaison between working groups and the commissioner.

Internal Auditor

Responsibilities

The internal auditor is part of the internal control function of the Yukon Territorial Government. Reporting directly to the commissioner his responsibilities are to audit the territorial accounts with the following underlying objectives:

- safeguarding the YTG assets from possible loss;
- checking the accuracy and reliability of the accounting data;
- promoting operational efficiency; and
- encouraging adherence to legislation and prescribed executive policy.

On completion of each audit, the department head(s) responsible for the areas wherein improvements can be made are provided with a copy of the audit report.

Review of 1976-77

The internal audit function is in the development stage. The previous internal auditor resigned effective June 30, 1976 and the incumbent did not commence employment until November 1, 1976. As a result, more reliance was placed on Treasury and Auditor General's staff to fill the gap. The present auditor has selected areas of apparent weakness and has concentrated his efforts on the smaller departments and spot-check type of audit in order to familiarize himself with the systems in effect.

Plans for 1977-78

A methodical coverage will be put into effect with concentration on setting up audit programs pertinent to each department and each area of responsibility.

Directorate of Intergovernmental Affairs

Responsibilities

Established in August 1974, this directorate has responsibilities which span the complete spectrum of government activities in the Yu-

kon. The directorate provides support service to the office of the commissioner in the co-ordination of federal and territorial programs and in the general area of intergovernmental relations. This includes liaison with federal departments and provincial governments particularly those jurisdictions bordering on the Yukon. The Directorate also provides the Yukon representation on ACND Committees. Responsibilities also include administration of the Federal Interdepartmental Co-ordinating Committee (FICC) and the provision of secretariat services to the General Committee, the Steering Committee and the Standing Sub-committee of FICC. The Directorate performs all protocol functions on behalf of the Yukon Government and is the focal point for the co-ordination of visits to the Yukon of federal ministers, representatives of foreign embassies and consulates and other visiting dignitaries.

Review of 1976-77

During the year the Directorate has continued to serve as a link to bring together divergent agencies of government and to co-ordinate approach to the Yukon's development needs and problems.

A close liaison has been maintained with the ACND (federal) and through its membership on the various committees the Yukon has continued to participate actively in the work of ACND. The Yukon Government has official representation on the following ACND Committees:

- General Committee
- Committee on Transportation
- Committee on Science and Technology
- Committee on Northern Communications
- Federal-Territorial Economic Planning Committee
- Committee on the Employment of Native Northerners
- Interdepartmental Committee on Northern Roads

During the year a number of committee meetings were held and a continuing liaison has been maintained with the various committees and the ACND Secretariat with respect to activities and projects affecting the Yukon. The Directorate has worked closely with the Science and Technology Committee's 'Working Group on Scientific Facilities in the North' in relation to planning for the extension of DIAND's Northern Laboratories Program to the Yukon. A Yukon Planning Committee, established by the Directorate,

has been co-ordinating federal and territorial input to the ACND Working Group regarding space requirements and site selection.

The directorate has continued its active involvement in the work of the Federal-Territorial Economic Planning Committee. Discussions have taken place in the past year within the forum of this ACND Committee and with DIAND officials on the development of a new approach to economic expansion in the Yukon. This has resulted in the formulation of a final draft of a General Development Agreement. Discussions were concluded in January, 1977 and the necessary enabling legislation will be tabled in the Territorial Legislature in April 1977.

The General Development Agreement (GDA) is largely an agreement of intent which serves as an umbrella under which joint and co-ordinated planning can be undertaken and specific socio-economic projects can be identified and developed for implementation under subsidiary agreements. The GDA, an agreement between the Yukon Government and DIAND, is considered to be the most appropriate and effective instrument for joint federal-territorial planning and development. It will result in a comprehensive and co-ordinated approach to expansion and will provide the opportunity for the Yukon to participate fully in determining its own priorities and assume a greater role in the planning and implementation of development initiatives.

The Federal Interdepartmental Co-ordinating Committee (FICC) held quarterly meetings and a number of special meetings during the year. FICC is chaired by the Commissioner of the Yukon and membership is composed of the senior representative in the Yukon of each federal and crown agency, as well as a senior official of the Yukon Government. FICC is a Standing Committee of the Advisory Committee on Northern Development. During the year in review FICC carried out the following broad objectives: the co-ordination of the activities of all federal government departments and agencies in the Yukon; the establishment of interdepartmental communication and continuing liaison between all government agencies in the Yukon.

A sub-committee of FICC comprising major departments of the Yukon Government was established during the year. The sub-committee is chaired by the Yukon Government representative on FICC and has representation from territorial departments whose spheres of operation interact with various federal agen-

cies. The sub-committee provides a more effective medium for Yukon Government input to FICC and is a forum for information sharing between the various federal and territorial departments. The establishment of the sub-committee has resulted in more effective liaison between the two governments and a better co-ordination of government activities.

The FICC Steering Committee has been actively involved during the year in a study of Federal Employment Conditions and Benefits in the North. A positional paper containing specific recommendations on a total package review of northern federal employee benefits was prepared and the FICC Secretary discussed the paper at a meeting in Ottawa of the National Joint Council Sub-Committees on Isolated Posts and Housing.

The Directorate has been responsible for the administration of the Yukon Manpower Needs Committee and the Manpower Training Needs and Research Sub-committee. The Directorate undertook a study aimed at improving the capacity of the Yukon Government in the manpower policy and planning areas and at finding ways to effect some co-ordination of the multitude of employment and training programs which have been implemented in the Yukon by a multiplicity of agencies. One of the results of the study has been the establishment of a manpower planning and co-ordinating component within the territorial department of education and the transfer of the Manpower Needs Secretariat to that department.

One of the major protocol activities in which the Directorate was involved during the year was the visit to the Yukon of His Excellency Governor General Jules Léger and Madame Léger. The directorate worked closely with Government House in working out the itinerary and logistical details for the Yukon tour and also liaised with Alaska Government officials in arranging the Governor General's official state visit to Juneau, Alaska to meet with Governor Jay Hammond. In addition, the Directorate and the Liaison Division of DIAND maintained liaison throughout the year in relation to the visits to the Yukon of foreign ambassadors and other dignitaries.

Plans for 1977-78

The directorate will continue to be the focal point for the co-ordination of all activities and programs of an interdepartmental and inter-governmental nature. It will remain actively involved in the work of the Advisory Commit-

tee on Northern Development and will maintain liaison with ACND particularly with regard to northern development activities which affect the Yukon. Relationships with government jurisdictions bordering on the Yukon will be maintained and strengthened.

Department of Treasury

Responsibilities

Management of the Yukon Consolidated Revenue Fund; collection of all taxes and revenues; supervision, control and direction of all matters related to the financial affairs of the territory; data centre and systems development for all government departments; central purchasing, central stores, traffic and distribution; and supervision of the Yukon Small Business Loans Program.

Review of 1976-77

Operation and maintenance expenditures are expected to increase from \$44 738 211 for 1975-76 to \$55 712 380 for 1976-77. This increase is attributable mainly to increased labour and material costs in the operation of all areas.

Revenue, recoveries and the operating deficit grants related to operation and maintenance are expected to increase from \$44 291 000 for 1975-76 to \$54 229 038 for 1976-77. Increases arose mainly from higher recoveries as a result of higher expenditures; volume increases; and an increase in operating grants.

Capital and loan expenditures for 1976-77 are expected to be \$19 789 500 compared with \$27 890 000 for 1975-76. The decrease is due mainly to decreased capital projects over the previous year. The \$19 789 500 to be expended is financed through cost-sharing agreements, and capital grants.

Plans for 1977-78

New computer applications are being studied and the repatriation of the data processing of YHCIP will be completed in early 1978. A centralized accounts payable system now in place will be reviewed and improved upon as required. Continued review of management reports will take place with implementation as they are developed.

Continued review of a central receiving system is taking place combined with a review of central purchasing and stores.

Department of Education

Responsibilities

The Department of Education has three main areas of responsibility:

Elementary and secondary education as provided in the School Ordinance; Vocational, technical and apprenticeship training for adults through the Vocational Branch; Developing and operating recreational programs through the Recreation Branch.

Elementary and Secondary Schools

In September 1976, the total enrolment was 5297 (Kindergarten to Grade 12) in 23 schools. On March 31, 1977 the enrolment was 5182.

The Second Annual Superintendent's Meeting and School Committee Conference was held in November 1976. The Superintendent presented his annual report to the meeting. An executive of School Committee was formed to co-ordinate the actions of schools committees and hopes to eventually perform a parents' advisory function to the minister.

The Department of Education continued its post-secondary education program of grants and bursaries. A total of \$194 000 was distributed to Yukon students on the following basis: 199 grants totalling \$117 450; 162 bursaries totalling \$76 550. Also 79 Canada Student Loan applications were approved for the sum of \$126 744.

Off-campus university courses from the University of Alberta were once again offered in Whitehorse. In addition to several undergraduate programs, interest was sufficient to offer a graduate level course. Interest in this area is definitely increasing.

Another social studies unit entitled *Oh, To Be a Placer Miner* has been published and will be ready for use in the intermediate grades in September 1977.

The French Language Center is in full operation with the Dialogue Canada program

offered to federal and territorial employees and the general public. Also, several adult non-credit extension classes were offered in Whitehorse and general interest courses in some of the rural communities.

Special project grants were made available to students and teachers interested in furthering their French studies. Student exchange and travel projects were funded, teacher workshops sponsored and further work was done in program development.

A two-year project to evaluate the rural elementary school French program was also initiated this year.

Vocational

Vocational Industrial Training

The Yukon Vocational and Technical Training Centre was established in 1963 through the co-operation of the Yukon Territorial Government and Government of Canada. Since then it has been expanded to meet the increasingly diversified demand placed upon it.

The function of the training centre is to provide adult students with the opportunity to obtain the knowledge, skills and practices in selected vocational or technical courses in order to expand the individual's potential employability.

Academic upgrading and pre-employment training courses are provided in Whitehorse at the Yukon Vocational and Technical Training Centre and in the outlying communities. Both full-time day and night courses are available.

On September 1, 1976 the administration of the Rehabilitation Branch was transferred to the Department of Health, Welfare and Rehabilitation. However, services to rehabilitation clients continued through the vocational school.

Academic Upgrading

Academic upgrading courses are offered to provide for four levels of requirements:

Basic literacy for persons with a level of education up to grade four; Basic education in mathematics and communication skills to grade 10 level for persons with a grade five to nine level of education. A program in life skills is offered in conjunction with the upgrading; BTSD III (Basic Training and Skill Development) for those who require only a few months of upgrading toward a grade 10 level in science, mathematics, and communications.

Community Courses

The major emphasis in the communities is on academic upgrading from illiteracy to the grade 10 level. Educational upgrading courses were provided in 12 communities in 1976 with an enrolment of about 140. The instructors were locally trained and supervised by a trained educator. In addition to academic upgrading a series of life skills courses were also offered to the community students.

Vocational Training

All regular courses provided at Yukon Vocational and Technical Training Centre are pre-employment courses. The majority are 10 months long and the rest are five months, offered twice a year. The heavy duty mechanics, automotive, electrical and building construction can lead to an apprenticeship where one year credit is allowed for course time. Welding is non-apprenticeable, but students are eligible to test for a DPW No. 3 welding ticket. The commercial courses include secretarial, clerk typist and bookkeeping and graduates go directly to employment. The nursing assistants receive five months training at the training centre and a further five months at the hospital after which time they can write the Canadian Nursing Assistants examination earning a certificate which has interprovincial recognition and allows them to work in all provinces. Food Service provides the trainees with the necessary qualifications to enter directly into industry as do basic mining, drafting and the heavy equipment operators course. All successful graduates receive a certificate on completion.

A linesman course was offered for the first time on a five month basis. It proved to be very successful with all graduates finding employment at the end of the course. Much of the success was due to help received from people in the industry and the excellent instructor seconded from CNT.

Night School

Although slow to start, night school had an extremely successful season, offering courses prior to Christmas and further courses from January to April. Welding was in great demand with classes each night of the week and again on Saturday. Courses were offered in welding, bookkeeping, typing, speedwriting, child care, and basic surveying. All courses were well received and attended as were non-vocational courses such as defensive driving and gourmet cooking.

Short Courses

Short courses are offered whenever the need arises and range in duration from a few days to a few weeks. With mandatory air brake certification necessary, 243 students successfully completed an air brake course in Whitehorse and 281 in the communities. Various skill upgrading courses for journeymen were provided including heavy duty mechanics and auto electric.

Project Work

Project work is an essential element in the structure of the Training Centre and each year more and more emphasis is placed on this aspect of the course. Most project work involves more than one trade, which sets the tone for on-the-job co-operation.

The building construction class has been involved in various projects this year, the largest being a classroom constructed for the mining course at the Grey Mountain site. This project was designed by the drafting class, wired by the electrical class and transported to the site by the heavy equipment operators. The construction course also completed the basement for the 1977-78 house construction.

The heavy equipment operators levelled the SS Klondike site, worked on the Grey Mountain Road and are presently engaged in a massive earth moving operation at the Range Road Dump.

Apprenticeship and Tradesman Qualifications

In 1976-77 a total of 38 people wrote Yukon Tradesman qualification examinations and eight wrote interprovincial standards examinations. A total of 19 qualified for Yukon certificates and six qualified for interprovincial standards red seal qualifications.

Fourteen apprentices completed their apprenticeship and received a Yukon Tradesmen's Qualification Certificate. Thirteen qualified for the Interprovincial Red Seal. There are 75 apprentices currently under contract.

As of March 31, 1977, 377 Tradesmen's Qualification Certificates have been issued in the 10 trades, and 42 persons have completed apprenticeships.

Management Development Program

The certificate program is provided in the Yukon by special arrangement with the Department of Extension of the University of Alberta.

The program includes three compulsory and 11 optional subjects. Those who wish to obtain a certificate must complete the three compulsory subjects and any three of the 11 options. Fourteen certificates were issued at the completion of the first cycle of six courses. The second cycle is in progress. Enrolment is as follows:

Management Update -41
Introductory Financial Accounting & Management Accounting -31
Business Organization & Administration -33

Supervisory Training

A total of 93 people completed five supervisory (foremanship) courses. This is a popular program which has been offered for the past six years in Whitehorse and at various mine sites.

Recreation Branch

The Recreation Branch enjoyed a year of increased activity and interest during 1976-77. The 12-member Recreation and Amateur Sport Advisory Committee made available some \$120 000 in grants to a variety of Yukon recreation associations. The Dawson City 'Pilot Project' was one worthy recipient of assistance from this committee. The 'Pilot Project' was a successful test of the concept of citizen involvement in the community recreation decision making process.

Recreation Branch was directly involved with eight communities sponsoring portable swimming pool programs in Clinton Creek, Dawson, Mayo, Beaver Creek, Carmacks, Carcross, Teslin and Watson Lake. Due to the nature of the pools the operating season is restricted to 12 weeks. This does not, however, deter each community's enthusiastic support for their swimming program.

The Recreation Branch was one organization involved in co-ordinating a contingent of Yukon Art and Artisans to attend the 1976 Montreal Olympics as participants in the cultural program. These representatives of the territory were excellent ambassadors and returned to the Yukon with a re-juvenated interest in their respective craft. In response to the increased interest in the cultural component of the Recreation Branch, the Yukon Conference on the Arts was held during the fall in Whitehorse. In excess of 50 artisans from throughout the territory took advantage of this opportunity to meet together and to

discuss common concerns. Evolving from this conference was a committee whose function is to implement the resolutions passed by the members present. With assistance from the Yukon Arts Council the Recreation Branch co-ordinated three major concert tours throughout the territory. Each tour was so designed as to involve school students during the day and a formal public concert in the evening. The 14 schools and six communities involved as hosts for performances during these tours were very enthusiastic and have requested additional programs of this nature.

The Recreation Branch, with financial support from the Advisory Committee, was able to launch a Yukon version of the National Coaching Development Program... 'Project Coach'. The purpose of the program is to improve the calibre of coaching throughout the territory and has been designed to be portable to each rural community. Project Coach Clinics have been offered in each of the major Yukon communities and based upon the participants reaction, is an unqualified success. The Recreation and Amateur Sports Advisory Committee assisted with the hosting of the Canadian Cross-Country Championships (Seniors) in Whitehorse this year. This event attracted a complement of top American and European skiers in addition to the best skiers in Canada, including all of the national ski team members. During the fall session of the Legislative Assembly, a 'Green Paper' on recreational development in the Yukon was tabled for discussion by the elected members. As a result of their discussions subsequently a recreation development ordinance was tabled and passed into law during the spring session, 1977. The passing of this ordinance is a major landmark in the development of recreation services in the Yukon.

Department of Territorial Secretary and Registrar General

Responsibilities

The department is responsible for registration services, inspection services, motor vehicles, Workmen's Compensation, Public Administrator, employment liaison, lotteries administration and the Electrical Public Utilities Board. The Queen's Printer, mail room, stationery stores, shipping & receiving and central records office are also administered as a service to all government departments.

Central operations are located in Whitehorse, with territorial agents at Dawson, Watson Lake, Faro, Haines Junction and Mayo. Government weigh scales are also maintained at Haines Junction, Watson Lake and Whitehorse.

Review of 1976-77

Registration Services

A total of 213 new companies were formed under the Companies Ordinance, including 138 new Yukon corporations and 75 extra-territorial registrations. Forty-six companies were struck off the register and 11 companies were withdrawn.

A total of 27 societies were incorporated under the Societies Ordinance. Nineteen prospectuses were filed under the Securities Ordinance, one security issuer, three brokers licences, and four security salesmen's licences were granted. Seventeen partnerships were registered pursuant to the Partnership Ordinance.

Under the Bills of Sale Ordinance, Conditional Sales Ordinance, Assignment of Book Debts Ordinance and Garagekeeper's Lien Ordinance a total of 4 584 documents were registered.

Under the vital Statistics Ordinance, 446 births, 190 marriages, and 115 deaths were recorded by the Registrar. Also indexed with Statistics Canada were seven stillbirths, eight name changes, 37 adoptions, six legitimizations, 34 corrections to original records, 11 delayed birth registrations, three delayed marriage registrations and two delayed death registrations.

During the year, 1 308 birth certificates and 147 marriage licences were issued at Whitehorse.

Under the Business Licence Ordinance, 508 licences were issued. Of this total 166 were issued by territorial agents.

Under the Insurance Licence Ordinance, 34 salesmen's licences were issued and nine salaries officials were licensed.

Recorded in the Professional Register were licences issued to two chiropractors, nine dentists, 11 dental therapists/hygienists, 53 doctors, 105 lawyers, two optometrists and eight pharmacists.

Inspection Services

Inspection Services travelled 16 762 miles during the year, with 107 man-days on the road.

A total of 546 liquor inspections were performed with follow-up correspondences. Two liquor licences were suspended for violations of the Liquor Ordinance. The responsibility for liquor inspections has been transferred from the Department of the Territorial Secretary to Liquor Control, effective April 1st, 1977.

A total of 338 labour standards inspections were conducted during the year, and 217 wage complaints were received. Enforcement of the Labour Standards Ordinance resulted in the collection of \$21 470.85 in outstanding wage entitlements.

The Workmen's Compensation office handled 157 matters and \$16 368.83 in outstanding assessments were collected. Sixty-eight inspections and investigations were conducted pursuant to the Accident Prevention Regulations.

A total of 684 investigations and inspections were conducted in respect of the Health Care Insurance Plan Ordinance and \$21 108.70 in outstanding premiums was collected.

Under the Business Licence Ordinance, 153 matters were investigated, five under the Companies Ordinance, three under the Consumer Protection Ordinance, one under the Hotels & Tourist Establishments Ordinance, two under the Fair Practices Ordinance and four under the Landlord & Tenant Ordinance.

Pursuant to the Motor Vehicle Ordinance 280 investigations were done, five pursuant to the Highway Sign Regulations.

Two hundred and thirty steam boiler inspections were completed, together with 19 inspections pursuant to the Elevator and Fixed Conveyances Ordinance.

Seventeen prosecutions were entered under the Labour Standards Ordinance, 29 under the provisions of the Health Care Insurance Plan Ordinance, one under the Motor Vehicle Ordinance, five under the Business Licence Ordinance and five under the Liquor Ordinance.

Motor Vehicles

This section is responsible for administration of the Motor Vehicles and Transport Public Utilities Board Ordinances plus enforcements of other related legislation.

Under the Motor Vehicles Ordinance, 32 052 licences, certificates and registrations were issued.

Weighscales at Watson Lake, Whitehorse and Haines Junction are operated on a 24-hour basis. Each weighscale employs one supervisor, three operators and one permanent part-time operator. All vehicles of 10 t or more gross vehicle weight are checked for legal weight, proper licensing and adherence to requirements under the fuel tax ordinance. Where necessary, licence plates or permits are issued. Where the vehicle is oversize or overweight, a permit or penalty fee is assessed according to circumstances. Fuel emblems or one trip fuel permits are sold where applicable.

There were 66 210 vehicles checked and recorded through the weighscases. The Motor Vehicles Ordinance is being rewritten for presentation to Council in the fall of 1977.

Workmen's Compensation

During 1976-77, 1331 employees were registered compared with 1318 in the years 1975 with the Workmen's Compensation Office.

The total number of claims reported during the year was 1426 compared with 1599 during the year 1975.

The new Workmen's Compensation Advisory Board was appointed by Commissioner's Order on November 1st, 1976. Members are as follows:

Mr. H.J. Taylor, Chairman - Representing Public

Mr. B. Moore, Vice Chairman - Representing Public

Mr. Gordon Wagner, Member - Representing Employers

Mr. Tom Walton, Member - Representing Workers.

Preparations were completed during the year for the first aid program; an agreement was made with St. John Ambulance whereby they would assume responsibility for the teaching of first aid to industry. Standard and advanced first aid courses were offered to workers who come under the scope of the Workmen's Compensation Ordinance at no charge.

Public Administration

At the commencement of the fiscal year on April 1st, 1976 the Public Administrator had 111 current files. During the year files were

opened for 61 deceased estates, three patients, one minor and four missing persons for a total of 69 and files closed consisted of 66 deceased estates, two patients, two minors and one missing person for a total of 71, leaving a total of 109 files being maintained at the end of the fiscal year on March 31st, 1977. Cash on hand at April 1st, 1976 was \$195 394.03 to which was added receipts of \$212 295.24 less disbursements of \$202 572.35 leaving cash in trust of \$205 116.92. In addition assets in trust as at March 31st, 1977 representing investments made by the Public Administrator were valued at \$112 792.06.

Records Management Program

The opening of the new YTG Administration Building resulted in many changes to this program, introducing decentralized records stations for current files, a new records centre for dormant records and a uniform file plan. The inter-departmental records management committee implemented policies and procedures for classified records and executive committee documents. The committee also assessed the overall performance of the program and recommended transfer of all records responsibilities to the Territorial Archivist, effective April 1st 1977. The new Yukon archives and records service will provide integrated management of records from creation through disposition. The responsibility for the mail room, stationery stores, shipping and receiving has remained with the Department of the Territorial Secretary.

Queen's Printer

The Queen's Printer is responsible for the printing of all ordinances, amendments to the ordinances, regulations, votes and proceedings of the council sessions and departmental requirements.

Olympic and Western Canada Lottery

There were 12 000 \$3.00 'Western' tickets sold in two draws from April until August, 1976.

In September, the Western Canada Lottery Foundation changed the \$3.00 'Western' ticket to a \$5.00 'Provincial' ticket on a bi-monthly draw basis. They also added a \$1.00

ticket with a draw every two weeks.

In October, 1977 the administration and distribution of the Western Canada Lottery was transferred to the Yukon Sports Federation. The Yukon sold 3 600 Olympic Lottery tickets in two draws from May until August, 1976.

After the August draw the Olympic Lottery Foundation became Loto Canada and the tickets are now distributed by selling agents within the territory. The government no longer has any dealings with Loto Canada.

Employment Liaison

This position is responsible for liaison with companies, industries and governments operating in Yukon to promote the training and employment of Yukon residents. Emphasis is placed on reducing the high unemployment rate amongst Yukon indigenes through referrals to employment and training opportunities. Other ordinances covered by this section are the Fair Practices Ordinance, Landlord and Tenant Ordinance, and the Consumer's Protection Ordinance.

Electrical Public Utilities Board

The Electrical Public Utilities Board has authority to approve rates and franchises with respect to public utilities operating in the Yukon.

Land Titles

During 1976-77, 3 501 documents were registered including 113 plans and 1 324 certificates of title issued. A new land titles ordinance is in the process of being drafted. This will replace the current Land Titles Act which is currently under federal government administration.

Department of Health, Welfare and Rehabilitation

Corrections Branch

Responsibilities

The Corrections Branch of the Department of Health, Welfare and Rehabilitation has the overall responsibility for providing adult (medium security) and juvenile (training home)

institutions, also adult and juvenile probation services.

Review of 1976-77

The number of admissions remained fairly constant when compared to the previous year. A slight increase in the percentage of inmates under the age of 26 is shown, 51.25 per cent as compared to 50.2 per cent for 1975-76.

Medium Institution Admissions

(Figures in parentheses represent 1975-76 statistics)

Male	310	(298)
Female	10	(17)
Male Remand	86	(98)
Female Remand	4	(6)
Total	410	(419)

Number of Offences Committed by Sentenced Inmates

Male	560	(547)
Female	17	(48)
	577	(595)

Age Groupings of Sentenced Offenders

	Male		Female		Totals
16 years	13	(8)	nil	(nil)	13 (8)
17 years	20	(13)	3	(1)	23 (14)
18 years	28	(22)	nil	(2)	28 (24)
19 years	22	(25)	nil	(4)	22 (29)
20 years	18	(16)	nil	(1)	18 (17)
21 - 25 years	58	(64)	2	(2)	60 (66)
26 - 30 years	42	(58)	3	(4)	45 (62)
31 - 40 years	61	(56)	nil	(nil)	61 (56)
41 - 50 years	37	(27)	1	(2)	38 (29)
Over 50 years	11	(9)	1	(1)	12 (10)
Totals	310	(298)	10	(17)	320 (315)

Percentage of inmates under the age of 26 - 51.25% (50.2%)

Recidivism

	Male		Female		Totals
Two times	36	(32)	nil	(2)	36 (34)
Three times	4	(5)	nil	(nil)	4 (5)
Four times	1	(2)	nil	(nil)	1 (2)
Five times	1	(nil)	nil	(nil)	1 (nil)
Totals	42	(39)	nil	(2)	42 (41)

Overall Recidivism Rate

Male	42/310 - 13.5%	(13.1%)
Female	0/10 - nil	(11.8%)
Total Average	42/320 - 13.1%	(13.0%)

Sentenced Inmates Admitted in Default of Payment of Fines

Male	107	-	34.5%
Female	7	-	70%

Racial Breakdown

	<i>Male</i>		<i>Female</i>		<i>Totals</i>
Indian	123	(117)	7	(10)	130 (127)
Non-Status Indian	47	(34)	nil	(nil)	47 (34)
White	140	(147)	3	(7)	143 (154)
Totals	310	(298)	10	(17)	320 (315)

Average Length of Sentence

Male	83.7 days	(70.34)
Female	7.0 days	(22.59)

Percentage of Liquor Related Offences to Total Offences Committed

Male	197/560 - 35.18%	(26.3%)
Female	6/17 - 35.3%	(22.9%)
Total	203/577 - 35.2%	(26.1%)

Sentenced Offenders From Major Settlements in the Yukon

	<i>Male</i>		<i>Female</i>		<i>Totals</i>
Whitehorse	244	(256)	10	(12)	254 (268)
Watson Lake	28	(20)	nil	(1)	28 (21)
Dawson City	14	(5)	nil	(nil)	14 (5)
Mayo	6	(6)	nil	(4)	6 (10)
Ross River	3	(3)	nil	(nil)	3 (3)
Old Crow	1	(1)	nil	(nil)	1 (1)
Haines Junction	5	(nil)	nil	(nil)	5 (nil)
Carmacks	1	(nil)	nil	(nil)	1 (nil)
Teslin	2	(2)	nil	(nil)	2 (2)
Carcross	4	(1)	nil	(nil)	4 (1)
Faro	1	(3)	nil	(nil)	1 (3)
Beaver Creek	1	(1)	nil	(nil)	1 (1)
Totals	310	(298)	10	(17)	320 (315)

Yukon Juvenile Training Home

The Adolescent Resocialization Program or the Program of Normalization, although very effective in a group home setting, offered a multiplicity of problems within the staffing structure of the institution. As a result, a number of adaptions were made to adapt a basic behaviour modification program tailored to the specific and unique needs of the juvenile offender in the Yukon.

The program underway consists of the four basic stages which were adopted one year ago, but the point structure has been modified and simplified for both the staff and offender. Under the present program, it is possible for a child to complete the program in 80 days. This is the minimum time under which a child is likely to move through the program and a more realistic target would be closer to 120 days.

Although the number of admissions over the past year have shown a slight increase, a greater number of these admissions were for a short period of time and primarily for the purpose of holding a juvenile for court. The number of juveniles within our care on a daily basis was down considerably from last year and there are no indications that the general population is likely to increase over the next year. The ratio of boys to girls has remained fairly constant, although there is a marked increase in the number of white juveniles placed in our care as opposed to those of the Indian culture.

Admissions in 1976-77/(1975-76)

Boys – 23/(21)
Girls – 19/(19)

Probation

During 1976-77, there was a total of 635 adults placed on probation. Fully 252 of these probationers were not obliged to report to the probation office. This means that over one-third of the probation orders indicated that the supervision and counselling function of probation was not required. These probation orders may have had other conditions respecting restitution (121 cases) or community work service (78) or have made mention of some specialized treatment such as alcohol counselling or psychiatry. Whatever the intention, it would seem that the trend is towards the probation officer fulfilling an enforcement function rather than that of a counsellor. There were 189 adults placed on probation with conditions respecting the Impaired Drivers Program. Almost another third of our adult caseload consisted of persons who were on probation to attend a special educational

course on the consequences of impaired driving.

The focus of the Impaired Drivers Program is essentially prevention. The remaining probation orders (194) contained the usual conditions with respect to probation supervision.

In 1976-77 there was an increase in workload, with each probation officer carrying an average of 80 cases.

Probation Statistics

Adult	Male	Female
Probationers on caseload		
April 1, 1976	282 (205)	25 (35)
New cases to March 31, 1977	575 (478)	60 (48)
Total supervised during period under review	857 (683)	85 (83)
Probationers under supervision		
March 31, 1977	311 (282)	42 (25)

Juvenile

Probationers on caseload		
April 1, 1976	36 (44)	18 (11)
New cases to March 31, 1977	71 (80)	10 (25)
Total supervised during period under review	107 (124)	28 (36)
Probationers under supervision		
March 31, 1977	55 (36)	6 (18)

Parole

National Parolees on caseload		
April 1, 1976	7 (6)	0 (1)
New cases to March 31, 1977	12 (12)	0 (0)
Total supervised during period under review	19 (18)	0 (1)
National Parolees under supervision		
March 31, 1977	7 (7)	0 (0)

Impaired Drivers Program

Number of courses (including 3 in Watson Lake)	14	(10)
------------------------------------------------	----	------

Number of probationers ordered to take course	189
Number attending	148 (135)
Number excused	16 (16)
Number charged	5 (32)
Number on caseload as of March 31, 1977	78

Alcohol and Drug Services

The division is responsible for the development, management and co-ordination of programs to combat alcohol and drug problems in the Yukon.

During the year, a public information program was designed and implemented to increase understanding of the hazards of alcohol use, alcohol problems, and to provide information which will enable alcohol users to avoid problems. The program included a series of eight newspaper information advertisements; three one-minute television messages; 10 radio information messages; and the production of a motion picture. The motion picture as a 30 minute, 16 mm film entitled *Nice and Easy, a film about booze*. The film is a dramatized documentary which depicts alcohol problems. It was filmed in the Yukon using Yukoners as cast members; and has been shown in all communities in the Yukon at least once and in several of the provinces. All components of the information program were aimed specifically at Yukon audiences who drink, expressing the theme, 'If you're going to drink, take it nice and easy'.

The major task of 1976-77 was to increase alcoholism treatment services in communities outside Whitehorse. This was accomplished by the appointment of two additional field workers. ADS has now divided into four regions and has a counsellor-community consultant serving each region. The services provided by these workers are; alcoholism counselling, referral to Whitehorse services such as the Detoxification Centre and Crossroads, follow-up treatment services, consultations to the courts and social agencies, and work with local community people to develop special programs in their communities to solve alcohol problems. To make alcoholism workers more accessible to community people, Alcohol & Drug Services has taken its first step towards decentralization and has opened an office in Faro.

A further step was taken to make alcoholism treatment programs available to people in small communities. ADS personnel designed a Community Alcohol Worker Program, based

on the concept that local people can be hired and trained to deliver alcohol treatment services in their community. These workers will not be experienced counsellors nor specialists in the alcohol field. Staff were involved in developing the program model, a training and operational manual, recruitment of local community people to operate the program and in the development of a special assessment tool to be used by the non-professional worker. When this program is introduced next year all persons entering an alcoholism treatment program in the Yukon will be documented. An evaluation will be made of treatment outcome as well as evaluation of the various components of the treatment programs. The new Community Alcohol Worker Program has not been tried in the alcoholism field, there it will be evaluated. The program is particularly geared to the small rural community and is a further step towards decentralizing operation and using resources already available in communities.

An out-patient counselling function was incorporated into the Detoxification Centre program during 1976-77. To date there has been an average of eight sober ex-residents returning for counselling each day.

In 1975-76 the division introduced a professional development-training program. This year a part-time training officer position was developed to organize and staff the program. An annual professional development program, the 'Counselling of Persons with Alcohol Problems' has been introduced to train 20 professionals from the social and health fields. In addition to this program a variety of training programs are carried out for the professional, non-professional and lay person.

Major emphasis was placed on the expansion of the Yukon Territorial Government Employee Alcoholism Program this year. In co-operation with the Public Service Commission, seminars and training sessions for all managerial and supervisory personnel were provided. Personnel from the two respective departments visited every community and highway camp outside Whitehorse and met with all managers and supervisors. In Whitehorse a series of seminars were held; at the completion of this program 75 per cent of all managers and supervisors in the Yukon had been involved in the special training program. To complement the training sessions a new manual for supervisors, which explained how management could use the Employee Alcoholism Program, was distributed. A similar series of training programs was completed for all DPW managers and supervisors in the

Yukon region and a special series of alcohol education seminars were held for line employees from that department. Emphasis was also placed on development of employee alcoholism programs in private industry and the division is now working with a large mining company and the union which services the mine, to develop an alcoholism program geared to meet their needs.

The major task of 1977-78 will be to perfect our community treatment programs model and to evaluate the impact of this program. Research will start to provide alcohol problems data based on alcohol problems in the Yukon, and an increased number of training programs will be introduced so that more professional and lay people alike can gain the necessary training to combat this problem in their community.

Health Services Branch

Responsibilities

The Health Services Branch administers the delivery of those programs which by statutory authority provide health services to residents of the territory. These programs naturally divide themselves into three groups:

General Health Services

A diversity of programs directed mainly towards the preventive aspects of health care; including disease control, mental health, inspection services, public health, health education, school dental and travel for medical and alcohol drug abuse therapy. In some of these program the expertise and assistance of the Medical Services Branch, Health & Welfare Canada is essential; such cases required a joint venture operation. In August 1976 rehabilitation services for disabled or handicapped residents was transferred from the Education Department to the Health Services Branch.

Yukon Health Insurance Plan

More commonly known as 'Medicare', the plan provides residents with insured medical services without geographic restriction. The plan conforms with the Medical Care Act (Canada) and is cost-shared by the federal government under that legislation. Premium contributions by residents provide the Yukon Territorial Government shared program costs.

Yukon Hospital Insurance Services (YHIS)

The plan provides in-patient and out-patient care for residents and, as with health care insurance, is not subject to geographic restrictions. This plan also conforms to the fed-

eral statute- Hospital Insurance & Diagnostic Services Act (Canada) - and is cost-shared by the federal government under the terms of that legislation. Yukon Territorial Government funding is provided from general revenue.

Review of 1976-77

A slight increase in utilization in both in-patient and out-patient services was recorded. The established pattern of demand for hospital services was maintained in territory 75 per cent; out of territory 25 per cent. Expenditures increased by some 75 per cent over the previous year, the visible result of the conversion of federally operated hospitals to budget review operations.

Health Services

	1976-77	1975-76	Increase (Decrease)
<i>In-Patients</i>			
Patient days	27,715	26,880	835
Separations	4,068	3,929	139
Average length of stay (days)	6.8	6.8	
<i>Newborn</i>			
Patient days	2,641	3,217	(576)
Separations	449	567	(118)
Average length of stay (days)	5.8	5.7	.1
<i>Out-Patients</i>			
Diagnostic	8,769	8,842	(73)
Accident	5,172	4,099	1,073
Accident (3rd party)	105	92	13
Total	13,709	13,033	676
<i>Costs</i>			
	1976-77	1975-76	Increase (Decrease)
In-patient services	3,535,275	1,926,351	1,608,924
Out-patient services	206,293	190,277	16,016
Administration	93,090	67,903	25,187
Third party recoveries	(17,355)	(4,326)	(13,029)
Total	3,817,303	2,180,205	1,637,098
Per capita cost	\$181.77	\$99.10	
<i>Yukon Health Care Insurance Plan: Costs</i>			
	1976-77	1975-76	Increase (Decrease)
Payments to practitioners	1,781,147	1,516,569	
Reimbursement of residents	13,173	9,610	
Payments to dentists	15,259	13,063	
Total cost of insured services	1,809,579	1,539,242	
Administration	193,117	134,352	
Total costs	\$2,002,696	1,673,594	
Per capita cost	\$95.36	\$73.73	

Social Welfare Branch**Responsibilities**

The Social Assistance and Child Welfare Ordinances provide the statutory basis upon which a diversified and comprehensive range of services and programs have been developed, and are administered by the Social Welfare Branch of the Department of Health, Welfare and Rehabilitation throughout the Yukon Territory.

These services consist of social assistance, including territorial supplementary allowance, services for the elderly, family service, child care and protection of children, services to unmarried parents, adoption services, and the operation of various geriatric and child care facilities. The Branch also provides funds for grants to community based social service agencies.

A full range of services is available to all residents of the Yukon with the exception of social assistance to persons of Indian status, which continues to be administered by the Indian Affairs Branch of the federal Department of Indian Affairs and Northern Development.

Organization

The Branch is organized into five units: Metro Whitehorse, Field Services, Special Placements, Geriatrics and Administration. Metro Whitehorse and Field Services are geographical divisions serving Whitehorse and the Yukon outside of the city. Special Placements is responsible for adoptions, foster home studies, group homes, and placement of children in various specialized resources both within and outside the Yukon. Geriatric Services is responsible for the operation of senior citizens' facilities, and for casework services for the aged and clients who are deemed to be permanently excluded from the labour force for medical reasons. The administrative section provides financial, statistical and general administrative support services for all branch operations.

The head office of the Branch is located in Whitehorse. Two highway workers also operate from the head office and with field offices located in Dawson City, Mayo, Faro and Watson Lake, coverage is provided for all the populated areas of the territory. A new office has been added in Haines Junction but is not yet operational.

Total permanent staff complement is 74, which includes institutional employees, but does not include house parents of the child care facilities, who operate under contract on a per diem basis.

Facilities

The Geriatric facilities consist of a senior citizens' home in Dawson City, and a senior citizens' home with an integral nursing care wing in the Riverdale subdivision of Whitehorse. These facilities provide a combination of residential accommodation, domiciliary care, and personal care for a total capacity of 65 senior citizens.

The Branch operates seven government-owned child care facilities under contract, and also contracts the services of one additional group home which is owned and operated by the Sisters of Providence. In Whitehorse there are three specialized homes: a Receiving/Assessment Centre, one for the physically or

mentally handicapped, and the other is for difficult-to-manage adolescents. The other two homes in Whitehorse offer family-type care in a group setting. In Dawson City and Watson Lake the homes provide both a receiving and group home function, while the Mayo home has expanded its functions to include community based activities of a preventative or therapeutic nature involving children from outside the group home as well as those placed in the home.

Review of 1976-77

The various programs and services of the Social Welfare Branch are designed to provide care and assistance to the elderly, alleviate poverty and distress among families and individuals; provide protection and care for children endangered by abuse or neglect; and to contribute towards the social and economic well-being of all people of the Yukon by recognizing and promoting the family and community as the nucleus of our social structure, values and life styles.

The Branch has continued to work towards an expansion of the type of placements available for children in care. There has been an increase in the use of private homes on a therapeutic basis and the expansion of the program in the Mayo group homes allows for more placements of adolescents exhibiting fairly serious behaviour problems.

In order to assist child care persons to deal with increasingly difficult behaviour, a start has been made to provide training to foster parents and group home parents. Other support services are in the process of development.

Close work with the Canadian Adoption Desk has allowed us to place almost all our children who are currently available for adoption. Due to the many problems involved in the adoption of older children, an adoption manual is being prepared to assist social workers in this area.

Efforts have been continued to encourage the effective co-ordination of services offered by the various resources in the community to children and families in need.

Within the geriatric unit the Alexander Street Senior Citizens' Home has been transferred to the Yukon Housing Corporation this past year and is now administered by the Whitehorse Housing Authority. Social Welfare Branch continues to provide casework services to the residents.

This Branch is presently conducting a survey of Yukon's senior citizens with an objective to try and identify present and future re-

quirements of persons who are 61 years of age and over for the purpose of supplying immediately needed services and of planning for future programming.

In conjunction with alcohol and drug services, a joint approach regarding provision of services is being utilized. An alcohol and drug worker has been scheduled to locate in Faro and will be sharing the social welfare office. In Dawson City an alcohol program geared at meeting the needs of the community is being planned jointly by the two branches.

Staff Development

In keeping with the overall objectives of the Branch, the Staff Development Program continued through the provision of seminars and workshops designed to improve standards of practice and enhance communication with other community groups and organizations.

The Branch assisted in setting up an adolescent workshop through the Inter-Agency Committee in order to have a forum for input from a wide segment of community service persons and private citizens.

Department of Local Government

Municipal Services Branch

Responsibilities

To provide municipal services for all unorganized communities in the territory; to assist in the establishment and operation of Local Improvement Districts; to maintain an advisory and inspection service for municipalities and Local Improvement Districts (LID) to ensure compliance with relevant ordinances; to assist municipalities through a grant system to deliver economical services to their taxpayers.

Review of 1976-77

Area development regulations for several communities including all local improvement districts were implemented, thereby establishing zoning regulations and planned land use.

Projects applied for under the Capital Assistance Program included the completion of a skating arena in Faro, a community hall in Carmacks and television reception (Anik Satellite) for eight Yukon communities.

Under the Home Owner's Grant Ordinance the implementation of home owner's grants, residential property tax rebate program, was successfully carried out and will be continued.

A successful training course was provided to municipal officers for more advanced accounting and administration procedures.

Community planning studies were completed for the city of Whitehorse and the town of Faro. An engineering study was carried out on extensions and improvements on the YTG owned water and sewer system in the city of Dawson. More detailed engineering plans are being prepared.

Plans for 1977-78

Regional Land Use Plans for the Mayo/Takhini area of Whitehorse and the Skagway/Carcross area will be implemented as well as Area Development Regulations for the community of Ross River. Under the Capital Assistance Program the completion of the piped sewer system and sewage lagoon in Teslin will be completed, and television reception will be implemented under the program; commencement on a sewage treatment plant for the city of Whitehorse and the construction of a community hall for Destruction Bay. Major amendments to the Municipal and Local Improvement District Ordinances will also be undertaken.

Community Planning and Land Disposal Services Branch

Responsibilities

The planning of Yukon communities to permit orderly economic development. The development of serviced land to fulfill the needs of Yukon communities. The sale, lease or other disposition of lands under the administration, control and management of the Commissioner of the Yukon Territory.

Review of 1976-77

The federal government's administrative control of the Alaska Highway and Haines Road right-of-ways has been transferred to the territorial government. As a result of this transfer and a number of land block transfers in 1975-76 the Lands Branch staff complement was increased with the addition of a draftsman and a lands inspector.

Amendments to the Lands Regulations were adopted which permit the holder of a valid residential-agricultural lease the option of cancelling the lease in return for being allowed the opportunity of purchasing four acres of land for use as a small holding homesite.

During 1976-77, 96 new sale agreements were issued, including 80 issued in White-

horse, while a total of \$1 351 380 was collected on existing agreements for sale.

Plans for 1977-78

The following projects will be completed by the application of asphaltic pavement:

- Riverdale, Areas D, E, F, G, & J
- Porter Creek, Cedar and Basswood
- Hillcrest Industrial Subdivision

The following projects are in progress and should be offered for sale during 1977-78:

Project

McPherson Subdivision		
Road Construction	78/79	
Riverdale Areas A, B, C&H		
Sewer and Water Installation	Paving	78/79
Porter Creek Area A		
Sewer and Water Installation	Paving	78/79

Other projects which are in progress during 1977-78 and which will be offered for sale in late 1977 or in spring of 1978 are as follows: Porter Creek Areas D1 and D2 (77-78 phase: sewer & water installations)

Haines Junction Cockfield St. & Camsell Ext.

Haines Junction Industrial

Watson Lake Industrial

Porter Creek Industrial

The department is currently undertaking the preliminary work for the development of the Hillcrest area which shall eventually become a major Whitehorse development.

Assessment Branch

Responsibilities

To provide real property assessment services to all taxing authorities in the Yukon Territory;

Preparation of assessment rolls for the municipalities and the Government of the Yukon Territory;

Render assistance to the Territorial Tax Collector;

Participate in Court of Revision and Appeal Hearings; and

Develop real property appraisals.

Review of 1976-77

Assessment figures for 1977 and corresponding 1976 figures, the following is a summary of total assessed:

	1976-77	1975-76
Whitehorse	86 555 920	77 427 740
Dawson	3 109 725	2 998 660
Faro	8 116 480	7 394 050
Commissioner	37 517 869	34 695 660

with these permits as mentioned, numerous inspections were made to assure the department that the various ordinances and regulations were being adhered to, to assure the owners and occupants that the buildings were safe from fire as well as structurally safe.

Ambulance use in emergencies:

Beaver Creek	11
Carmacks	22
Dawson City	41
Destruction Bay	09
Faro	65
Haines Junction	29
Mayo	10
Teslin	31
Watson Lake	110
Whitehorse	713

In addition to this, the Whitehorse ambulance answered 142 calls outside Whitehorse which included meeting the highway ambulance, as well as covering the Carcross and Tagish area.

Tourism and Information Branch

Responsibilities

The Branch is responsible for promoting travel to the Yukon Territory and encouraging the development of tourist attractions and facilities within the territory. In addition, it is responsible for the government's public information programming, maintenance of a system of campgrounds and planning for Parks and Historic Sites.

Review of 1976-77

In a year when tourism became Yukon's major economic activity due to strikes at most of the Territory's operating mines, the industry recorded its first decreases in over a decade. Border crossings - the primary indicator of visitor volumes - dropped 10.2 per cent in 1976, the result of a 16.6 per cent decrease in highway traffic. Monthly decreases in the peak summer months were as high as 19 per cent in August alone. Entries on the Haines Road dropped 33 per cent.

Air traffic was up a marginal three per cent despite a 10-day strike in June. Other modes, primarily White Pass and Yukon Railway increased four per cent. The major positive note of the season was an increase in September entries, up eight per cent. This continues a trend of late season travel established over the past three years. Although the Yukon had an overall decrease of 10.2 per cent,

there was a total of 305 273 visitors with expenditures totaling \$25 000 000.

Writers, film crews and travel agents were hosted by the branch at various times throughout the year.

An exit survey was carried out in Dawson City by B.C. Research under contract with Parks Canada during the summer of 1976. Results were intended to provide detailed information specifically for Dawson City area traffic. In a 12 week survey period approximately 30 300 tourists visited Dawson City; 86 per cent travelled by private vehicle, 11 per cent came with an organized tour and three per cent by other modes.

Visitor information centres were open throughout the summer at Watson Lake, Beaver Creek, Haines Junction and Dawson City. The branch shared in the cost of operating the Chamber of Commerce Information Centre in Whitehorse.

In its first year of operation the Parks and Historic Sites Division of the branch concentrated on operational planning and policy formulation, with emphasis on the campground operations.

The Information Division continued to provide complete public information programming to user departments, including the services of its photography section. With the move to the new administration building in May, 1976, the division started operation of an inquiry centre which handles the government information phone, counter inquiries, building tours and the main switchboard.

Yukon House in Vancouver continued its wide range of services which include tourism and general promotions, assistance to Yukon Government departments and liaison with media, government and the business community.

Plans for 1977-78

A highway signing program will be implemented in 1977; tourism industry marketing activities will be financed through a matching fund program; implementation of inventory, planning and interpretation policy recommended by the Yukon Historic Sites and Monuments Board; conduct resident outdoor recreation survey; revision of campground operational activities to achieve more efficiency; expanded use of electronic media for information programs; and evaluate role and function of Yukon House.

Game Branch

Responsibilities

This Branch is responsible for the administration and enforcement of the Game Ordinance, Fur Export Ordinance, Brands Ordinance, Pounds Ordinance, Migratory Birds Convention Act, Canada Wildlife Act, International Agreement on the Conservation and Management of Polar Bears, International Agreement on Trade of Endangered Species of Flora and Fauna, Game Export Act and the Freshwater Fisheries Regulations, as well as for conducting programs that are necessary for proper wildlife resources management.

Review of 1976-77

The Branch was able to expand its technical section by hiring three biologists with the following responsibilities: a big game researcher to conduct an investigation of the Porcupine Caribou Herd in the northern Yukon and its relation to the Dempster Highway; a fur bearer biologist to look after proper trapline management, and a habitat biologist to map and catalogue critical wildlife areas and to assist other biologists in questions of range use, food selection and other botanical matters.

Big game inventory work was continued and covered game management zone 8 (Glenlyon Range, Big Salmon Range, Semer of Hills). Routine annual surveys were also carried out to assess the status of a few accessible sheep populations around Whitehorse, a remnant goat population in south-central Yukon, to keep track of an introduced elk herd; and to monitor the performance of the moose population in the Teslin area, a special study area of the Game Branch.

Hunter check stations were maintained during the antlerless moose season and during the Dempster caribou season to obtain reproductive tracts, jaws and other biological information.

The trophies of all sheep, goats and grizzlies shot in the Yukon during the 1976-77 season were turned over to the Game Branch for evaluation by biologists to monitor the trends of these populations in various game management zones in the Yukon. Detailed questionnaires were sent to all hunters at the end of the hunting season in order to establish realistic harvest statistics.

The Game Branch also began to do preliminary biological surveys of some of the Yukon's major river valleys. Some of these have potential for hydro-electric power developments, others are the sites of placer opera-

tions or other types of developments. During 1976-77 the Sixymile River survey was completed and winter surveys were also done in the Stewart River and Frances River floodplains.

The big game harvest for the 1976-77 season was as follows: Moose 1419, caribou 1717; sheep 263; goat 15; grizzly 92; and black bear 117.

There was a drop in fur harvest because of the scarcity of lynx, which appears to be at the low of its 10-year cycle.

Waterfowl research continued in the Old Crow Flats and the Game Branch crew was able to band over 1000 birds. Waterfowl surveys as well as enforcement patrols were also carried out along the Yukon's north coast.

A hunter safety course, which was initiated in 1974-75, was expanded and taught in a number of Yukon schools.

Plans for 1977-78

One new wildlife technician will be hired who will look after pipeline issues and other major development to assess their impact on wildlife.

Big game inventories and waterfowl research in the northern Yukon will continue. The mapping of habitat in particular critical wildlife areas, using Landsat aerial photography as well as ground truthing will begin in summer 1977. The compiling of fur harvest statistics will be computerized and research will be done on beaver to develop a better management scheme. A detailed long-term study will be started on the Porcupine Caribou Herd and the possible adverse affects on it of the Dempster Highway. A biological reconnaissance will be carried out in Rose Lake and Frances Lake areas. The hunter training programs will continue and will hopefully cover all Yukon schools. Considerable involvement by the Game Branch is anticipated for pipeline related activities.

Library Services Branch

Responsibilities

To provide library services to the public and to schools throughout the Yukon, and to provide archival services under the authority of the Archives Ordinance.

Review of 1976-77

With a stock of approximately 100 000 catalogued books the Library Services Branch served 65 outlets in various Yukon communities. On a rotating basis 74 722 books were

shipped to these communities. The cataloguing and processing of 15 526 items of library materials (new books, added copies, paperbacks and audio-visual materials) were completed. The members of the Whitehorse Public Library borrowed 70 350 books during the year. The film library distributed 9 750 films throughout the territory. The Yukon Archives dealt with 3 948 research inquiries.

The Art Gallery of the Whitehorse Public Library held 14 exhibitions, seven of Yukon and seven of Western Canadian Artists. Public library activities included growth in programs in community branches: co-ordination in Faro of adult education and cultural activities through a community services librarian project; crafts fair in Watson Lake, and two arts and crafts exhibitions in Haines Junction. Watson Lake created a library board of citizens appointed by the Local Improvement District. In spite of these developments growth of public library service was curtailed through closing the Takhini Branch as a cost reduction and alteration of the demands for reference services and use of facilities in the Whitehorse Public Library due to its proximity to the new Territorial Administration Building. In co-operation with the Yukon Teachers Association, an in-service workshop was held on utilization by teachers of total library resources. Media Services Division assisted many agencies with audio-visual technical support and special programs, including one on Climbing the Chilkoot Pass and a multimedia three screen production on Sourdough Rendez-vous.

Department of Legal Affairs

Responsibilities

The Department of Legal Affairs has two main functions: to provide legal advice and services to the Commissioner, Legislative Assembly and to departments and agencies of the territorial government; and to supervise and administer the administration of justice throughout the territory. Additional responsibilities are to administer programs to compensate victims of criminal injury; to provide a court-worker program; and to administer a comprehensive legal aid scheme.

The director of the department is the legal adviser to the Commissioner. His responsibilities include the drafting of legislation upon receiving instructions from department heads or executive committee members after the policy has been approved by the Executive Committee. The draft legislation is cleared through a subcommittee on legislation and is

subsequently tabled at the next session of the assembly. The director attends all assembly sessions.

The department provides administrative support to the Court of Appeal, Supreme Court, Magistrate's Court, Juvenile Court and all Justice of the Peace Courts. Permanent courtrooms are established in the federal building in Whitehorse and the territorial administration buildings in Watson Lake and Dawson City. Courts convene in community facilities elsewhere.

Review of 1976-77

Regular circuits to the outlying communities are made by the Magistrate's Court which is accompanied by a legal aid lawyer, courtworker and a probation officer. Justices of the Peace are located throughout the territory having jurisdiction in summary conviction offences. A number of Justices of the Peace are also coroners, small debt officials and operate Courts of Canadian Citizenship. An annual Justice of Peace Conference is held in Whitehorse in February of each year.

The Government of the Yukon has entered into cost sharing agreements with the federal government to provide a comprehensive legal aid scheme; to fund Skookum Jim Friendship Centre as the carrier agency to operate a courtworker program; and to provide compensation for the victims of criminal activity.

Policing of the territory is carried out by the Royal Canadian Mounted Police and a cost sharing agreement to train Indian Special Constables has been implemented.

Plans for 1977-78

To expand the Courtworker Program to include a second full-time courtworker; and to review/update of departmental legislation.

Department of Highways and Public Works

Responsibilities

To maintain and improve the highway system in the Yukon Territory to established standards; to administer and co-ordinate road maintenance and road re-construction programs financed either 85 or 100 per cent from federal government sources.

To maintain all airports and airstrips in the Yukon Territory with the exception of major airports maintained by Transport Canada.

To operate ferries over the Yukon River at Dawson City and a barge over the Pelly River at Ross River.

To plan, design and arrange for the supply and installation of water and sewer systems, sewage lagoons and similar municipal type works for settlements throughout the Yukon. To assist the Department of Local Government in subdivision planning and to arrange for subdivision construction. To provide assistance to municipalities in their capital and M&O programs.

To design in-house or through agreements with consulting architects all buildings required by YTG and to implement and supervise construction.

To maintain all buildings owned by the Yukon Government with the exception of those falling under the control of the Yukon Housing Corporation.

To manage all government office buildings and office leases including operations and security.

To maintain through mechanical workshops in Whitehorse, Dawson City and Watson Lake all government-owned wheeled and tracked equipment and to arrange for replacement of equipment under established replacement schedules; also to specify and arrange for the purchase of additional equipment.

To provide professional engineering services to the Commissioner and all territorial departments.

Review of 1976-77

A total of 4252 km of roads were maintained including 1333 km of roads maintained during the summer months only. The dust control program on all roads with a daily traffic count during the summer months of 250 vehicles or more, was continued and a total of 9042 t of calcium chloride was used in two applications of five tonnes each per 1.6093 km per application. Operations were carried out of 22 highway maintenance camps and a number of mobile camps for crushing and surfacing crews.

The 56 t George Black Ferry was launched on May 14, 1976 and dry docked on October 14, 1976 in Dawson City. During this period a total of 34 462 vehicles and 101 270 passengers made use of this free service. During the previous year, 32 444 vehicles and 92 709 passengers were transported over the Yukon River in Dawson. A skyline was operated at Dawson City at the fall freeze-up and spring break-up periods to move asbestos fibres over the Yukon River from the Cassiar, Clinton Creek Mine. During the winter months an ice bridge was constructed and maintained.

The barge at the Ross River settlement carried 3 548 vehicles over the Pelly River. This cable barge operated eight hours per day, seven days per week and was mainly serving mining exploration and some local traffic. All airports and airstrips throughout the territory were maintained with the exception of the airports at Whitehorse and Watson Lake.

The expenditures of the Highway Maintenance Section of the department totalled approximately \$11.7 million.

The projects section of the department completed a number of road, building and airport construction projects which included a liquor store extension in Watson Lake, completion of the Ross River school project, completion of Whitehorse workshop extension, completion of Robert Campbell Bridge construction, reconstruction of territorial roads, relocation of highway at Mayo Airport, bridge replacement at South McQuesten River, road reconstruction of Hunker-Granville Road, Faro Airport construction, paving of Watson Lake Airport access road, asphalt overlay M.P. 0-6, Klondike Highway, runway construction at Dawson Airport, refuelling systems, of paving on the Campbell Highway, major culvert installations on Nahanni Range Road, installation of guard rail on Alaska Highway, commencement of reconstruction of the first 40.2 km of Dempster Highway and many more minor projects. The department was also involved in the completion of the new territorial administration building in Whitehorse.

Buildings, roads and airports projects expenditures totalled approximately \$4.2 million.

Routine and emergency building maintenance was carried out year-round by a complement of 30 tradesmen. The Building Maintenance Section did not encounter any major repair problems. Due to a shortage of funds no re-painting projects were carried out. While all territorially owned buildings were maintained by this section, only minor repairs were carried out on behalf of the Yukon Housing Corporation. Minor building maintenance was also carried out in outlying areas only for the RCMP and Transport Canada on a request basis. The Building Maintenance Section incurred expenditures of approximately \$710 000.

The Municipal Engineering Section planned and implemented construction of a number of municipal engineering projects on behalf of the Department of Local Government. Projects included: completion of water and sewer extensions in Porter Creek; construction of water, sewer and roads in the Riverdale Sub-

division extension; extension to water and sewer system in Mayo including renovations to the pump station; extension to Carmacks sewer system; construction of water, sewer and roads in the new Hillcrest Industrial Sub-division; and a number of other more minor projects. This section also completed a number of designs for 1977-78 construction projects. These included the Teslin sewer system, Porter Creek subdivision extensions, Haines Junction subdivision extensions, development of the McPherson sub-division and some smaller projects. This section also provided advice to the Local Improvement Districts in the operation and maintenance of their water and sewer systems.

The department employed 438 casual and permanent employees at the height of the season in July, 1976 and 266 employees at the low point in February, 1977 which compares to 449 and 252 employees respectively for the previous year.

Plans for 1977-78

Continuance of O & M programs under established procedures. Projects in the Municipal Engineering Section will include the construction of a sewer system and a lagoon for Teslin, the servicing of approximately 300 new lots in Porter Creek with roads and water and sewer, completion of the remainder of the Riverdale subdivision, planning of a major subdivision development near the present Hillcrest subdivision, planning and development of a number of small acreage residential subdivisions in smaller Yukon communities. The Projects Section will be responsible for the design and construction of a gymnasium addition to the Selkirk Street School in Whitehorse, the construction of a gymnasium at Old Crow, an extension to the Watson Lake School, construction of a highway maintenance complex along the Skagway Road, replacement of drainage structures on the Nahanni Range Road, reconstruction of the first 40.2 km of the Dempster Highway, major culvert installations on the Dempster Highway and paving of 16 km of the Klondike Highway.

It is proposed to implement a highway maintenance and equipment management control system based on quality, quantity and productivity standards.

Yukon Housing Corporation

Responsibilities

The Yukon Housing Corporation is responsible for the development, provision and opera-

tion of housing projects and programs to meet the needs of Yukon residents. The corporation's client group extends to many segments of the population including low and modest income individuals and families, senior citizens and staff of the territorial government.

Review of 1976-77

In terms of construction activity, several new projects were undertaken during 1976-77. A 24-suite apartment was constructed under the Low Rental Housing Program, as well as 13 units in three staff housing projects. In addition, several of the projects undertaken during the previous year were carried over for completion during 1976-77.

In the area of home ownership the corporation sold 28 semi-detached units to individuals under the Assisted Home Ownership Program. As well, the YHC developed a mechanism for selling rental/purchase housing units to tenants. At year end, one sale had been completed and a number of offers were pending.

Plans for 1977-78

A modest building program of seven to 15 units is planned along with a major program of up-grading of older staff housing units. This upgrading will concentrate on the health and safety aspects of the units and upgrading of the thermal efficiency. To a lesser extent esthetic improvements will also be included in this program.

The corporation will attempt to increase opportunities for home ownership. In addition to the rental/purchase units available, staff housing will be available for sale to tenants. Other programs to increase home ownership opportunities are being investigated.

Department of Liquor Control

The Liquor Control Department regulates the importing, distribution and retailing of all alcoholic beverages within the requirements of the Liquor Ordinance and attendant regulations. The department, in liaison with the Yukon Liquor Board, is also responsible for the issuance of all licences and permits, and for the enforcement of the Liquor Ordinance.

Review of 1976-77

The following Liquor Licences were issued during 1976-77:

Cocktail Lounge (liquor)	46
Club Liquor	7
Tavern (beer)	16
Canteen (beer)	6
Dining Room (liquor)	23
Restaurant (beer & wine)	31
Liquor Off-Premises	53
Beer Off-Premises	31
Room Service	16
Special Licences (liquor)	3
Aircraft	2
Total	234

This is a slight increase from the 233 issued during the previous year.

The following permits were granted and issued:

Special Occasion – 685
Reception – 81
Total Sales (inc. surcharge) 1975-76 = \$7 967 034.41
Total Sales (inc. surcharge) 1976-77 = \$8 149 713.14

Comprehensive research and analysis accompanied the proposal to amend the Liquor Ordinance, placed before the Legislative Assembly in November 1976. One main purpose of the amendment was the formation of the Yukon Liquor Corporation, which took place April 1, 1977. The corporation was to be given duties similar to those of equivalent bodies in the provinces, adapted to Yukon needs, with the government retaining specific control over policy, pricing and capital expenditures.

The inspection branch, formerly part of the Territorial Secretary Department, was incorporated into the new organization structure with appointment of a chief and one inspector. Opportunity was also taken to clearly delineate responsibilities, procedures and requirements according to the Liquor Ordinance.

The empty beer bottle system which commenced in 1975 has been expanded to include foreign beer bottles, the system has been well received and is operating smoothly.

Construction of an addition to the Watson Lake Liquor Store was completed to meet storage requirements necessitated by sales increases.

Plans for 1977-78

Commencing on April 1, 1977, the Yukon Liquor Corporation will function according to the specifics of the new Liquor Ordinance.

Review of the organizational structure, general policies and procedures will proceed according to the decisions of the board and directors. The new licensing and inspection branch will carry out their responsibilities by establishing a rapport with licencees as well as necessary enforcement.

Selection of new brands of liquor according to demands and public acceptance will continue. Low alcohol table wines continue to increase in popularity, which will reflect in purchasing trends.

CANADIAN ARCTIC

